

BCA V Semester

BCA- 501 Linear Algebra and Geometry

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Examination Scheme-

Theory paper is of 40 marks. In which there is assignment of 10 marks.
Each theory question paper will contain 5 questions of 3 sub parts.

Course Objective- To introduction the concept of linear algebra and geometry which build strong foundation of students in many area of computer science including graphics image processing, cryptography, machine learning etc.

Learning Outcomes: After this course students will eligible to-

1. Vector space and linear maps which help in the image processing.
2. Concept of eigen vectors and eigen values and that have very important application in computer vision and machine learning
3. Group theory which plays a vital role in application of cryptography.
4. Cone and cylindrical surface which help in cartography and animation.

Unit I

Groups, Definition, Order of an element. Subgroups; Definition, Necessary and Sufficient Condition. Coset Decomposition. Right and Left Cosets, Lagrange's Theorem. Definitions and Basics of Normal Subgroups, Quotient Group, Homomorphism and Isomorphism of groups, Kernel of Homomorphism.

Vector Spaces. Vector space, Subspace and Quotient Space, Linearly Dependent and Independent Vectors, Linear Maps. Definition and properties. Homomorphism and Isomorphism of Vector spaces, Kernel of a Linear Map.

Unit III

Matrix Representation of a Linear Map. Rank and Nullity of Linear Map. Fundamental Theorem of Vector Space Homomorphism. Eigen Values and Eigen vector of Matrix, Cayley Hamilton Theorem: Proof and Applications.

Unit IV

Parabolic, definition and description. Elliptical and Hyperbolic paraboloid, Parabolic of revolution, Tangent planes and Normal to a parabolic. The Ellipsoid, Tangent & Normal plane to it, director sphere of an ellipsoid, conjugate diameters and diametrical planes to ellipsoid, locus of chords.

Cone of conicoid, right circular Cone. The Cylinder definition, equation, right circular Cylinder, enveloping cylinder to a conicoid.

Reference Book

- (1) Linear Algebra by I. N Herstein, Wiley Publisher.
- (2) Analytical Geometry of Three Dimensions by P. K. Jain, New Age International Publisher.

Reference Books:

- (1) Linear Algebra Schaum's Series by Seymour Lipschutz & Mark Lipson, Mc-Graw Hill Publisher.
- (2) Linear Algebra by S. N. Goel, Kedarnath Ramnath Publication, Meerut.
- (3) Linear Algebra by Kenneth Hoffman and Ray Kunze, Prentice Hall of India Pvt. Ltd. New Delhi.

BCA V Semester

BCA- 502 Computer Network

Session 2020-21

Subject nature	compulsory
----------------	------------

Examination Scheme-

Theory paper is of 40 marks. In which there is assignment of 10 marks.
Each theory question paper will contain 5 questions of 3 sub parts.

Course Objective:

1. Build an understanding of the fundamental concepts of computer networking.
2. Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3. Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4. Independently understand basic computer network technology.
5. Identify the different types of network topologies and protocols.
6. Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.

Course Learning Outcomes:

Upon completion of this course, the students will be able to:

1. Understand the concepts of data communication and networks, TCP/IP and OSI reference Models
2. Discuss the process of Multiplexing, switching and transmission media in networks.
3. Understand the services of data link layer and protocols.
4. Understand multiple access protocols and Ethernet.
5. Understand the services of network layer, transport layer and application layer.
6. Familiarise with the Transmission Media, Flow Control and Error Detection & Correction.
7. Understand fundamental concepts in Routing, Addressing & working of Transport Protocols.
8. Gain familiarity with common networking & Application Protocols.
9. Understand Wireless LANs & Wireless Sensor Networks Operation.

Data communications and networking for Today's Enterprise, A communication model, Data Communications, Networking, and the Internet. Network model, need for a protocol architecture, The TCP/IP protocol architecture, The OSI model, Addressing. Data transmission: Concept and terminology, Analog and digital signals, Transmission impairment, Channel capacity.

Reference

Digital transmission: Digital-to-digital conversion, Analog-to-digital conversion, Transmission mode. Analog transmission, Digital-to-analog conversion, Analog-to-digital conversion.

Bandwidth utilization: Frequency division multiplexing, Wavelength division multiplexing, Synchronous and statistical time-division multiplexing, switching: Circuit switching Packet switching, Types of errors, framing (character and bit stuffing), error detection & correction

Data Link Layer protocols, LAN Protocol Architecture, Bridges. Emergence of High — Speed LANs: Ethernet, Token Bus, Token Ring, Wireless LAN Technology (Wi-Fi), Routing in switched network: Routing in packet switched networks.

transport protocols: Principles of internetworking IPv4 & IPv6, Connection- mechanism, TCP and UDP, Network security: Encryption and

Act

Text Books:

- (1) Data Communications and Networking, Behrouz A. Forouzan, McGraw-Hill, 4th Ed.,
- (2) A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI

Reference Books :

- 1) Computer Networking: James F. Kurose & Keith W. Rose , Pearson Education, Third Edition
- 2) Communication Networks: Fundamentals Concepts and Key Architecture : Alberto Leon-Garcia and Indra Widjaja, , Tata McGraw-Hill Publishing Company Limited, ISBN 0-07-0402235-3.
- 3) Data and Network Communication: Michael A. Miller, Delmar Thomson Learning inc
- 4) Introduction to Computer Networks: Douglas E. Comer , Prentice-Hall. Alberto Leon-Garcia and Indra Widjaja, Communication Networks –Fundamentals Concepts and Key Architecture , ~~Tata McGraw-Hill~~ Tata McGraw-Hill Publishing Company Limited, ISBN

BCA V Semester

BCA- 503 Introduction to Cloud Computing

Session 2020-21

Subject Nature	Compulsory
----------------	------------

Course Objective: After completion of this course, student will be

1. Working of cloud computing
2. Importance of cloud in current era
3. Learners will understand ,how to access and how to use free cloud services and paid cloud services

Learning Course Outcome-On completion of the course the students should be able to:

1. Understand the basic terminology of Cloud related to backup
2. Working of cloud computing
3. Importance of cloud in current era
4. Lerner will understand ,how to access and how to use free cloud services and paid cloud services.
- 5 Lerner will understand how they are using cloud in daily life with different mobile application

Examination Scheme-

Theory paper is of 50 marks. In which there is a practical of 25 marks.
Each theory question paper will contain 5 questions of 3 sub parts.

Unit I

introduction to cloud computing, History, importance of cloud computing in the 21st century, characteristics of cloud computing, what cloud computing really is and isn't, pros and cons of cloud computing, technologies in cloud computing, migrating into cloud.

Types of clouds, cloud infrastructure, cloud application architecture, working of cloud computing, trends in cloud computing, cloud service models, cloud deployment models, cloud computing and services pros and cons.

Virtualization technology, cloud life cycle model, role of cloud modeling and architecture, cloud system architecture, virtualization, types of virtualization, importance and limitations of virtualization, virtualization in cloud computing.

Data storage, introduction to enterprise data storage, data storage management, file system, cloud data stores, cloud storage characteristics, applications utilizing cloud storage.

Introduction to web services, cloud service deployment tools, management/ administrative services, risk management in cloud computing, introduction to apache hadoop.

Text Books:

- 1) Cloud Computing: A practical approach for learning and implementation, 1st edition, Pearson, A. Srinivasan, J. Suresh.

Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010

-
- 3) Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
 - 4) Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010

BCA V Semester

BCA- 504 Introduction To Data Science

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course objectives:

Course Objectives (CoB): The course is aimed at

1. Building the fundamentals of data science.
2. Imparting design thinking capability to build big-data
3. Developing design skills of models for big data problems
4. Gaining practical experience in programming tools for data sciences
5. Empowering students with tools and techniques used in data science

Learning Course Outcome-

At the end of the course the student should be able to:

1. Apply data visualisation in big-data analytics
2. Utilise EDA, inference and regression techniques
3. Utilize Matrix decomposition techniques to perform data analysis
4. Apply data pre-processing techniques
5. Apply Basic Machine Learning Algorithms

Examination Scheme-

Theory paper is of 50 marks. In which there is a practical of 25 marks.
Each theory question paper will contain 5 questions of 3 sub parts.

Unit I

Introduction: What is Data Science? The Data Science Process, Different Types of Data: Quantitative, Categorical. Graphical Summaries of Data: Pie Chart, Bar Graph, Pareto Chart, Histogram. Measuring the Center of Quantitative Data: Mean, Median, Mode. Measuring the Variability of Quantitative Data: Range, Standard Deviation, and Variance.

Unit II

Overview of R, R data types: Vectors, Matrices, Factors, Lists, Data Frames, reading and writing data, Control structures, functions, scoping rules, dates and times

Unit III

Introduction to Data Cleansing, Missing and Repeated Values, Feature Engineering, Outliers and Errors, Finding Outliers, Cleaning Data with R.

Unit IV

Machine Learning: Definition and overview, Regression, Simple Linear Regression, Multiple Regression, Assessing Performance, Ridge Regression, Feature Selection & Lasso, Nearest Neighbors & Kernel Regression

Unit V

Machine Learning: Classification, Linear Classifiers & Logistic Regression, Learning Linear Classifiers, Overfitting & Regularization in Logistic Regression, Decision Trees, Handling Missing Data, Boosting.

BCA V Semester

BCA- 505 Human Values And Professional Ethics

Session 2020-21

Subject Nature	Compulsory
----------------	------------

Course objectives:

Course Objectives (CoB): The course is aimed at-

To objective of the course is to disseminate the theory and practice of moral code conduct and familiarize the students with the concept of right and virtuous in individual social and professional

Learning Course Outcome-

1. Promote students to improve professional skills to get access to employment.
2. Imparting life skills (jeevan Kausal)
3. Promote linkage of students with the society to ensure their productive activities
4. Inculcate the spirit of Innovation/Entrepreneurship among students Train the students
5. Promote critical thinking and promote avenues for display of these talents

Examination Scheme-

Theory paper is of 40 marks. In which there is assignment of 10 marks.
Each theory question paper will contain 5 questions of 3 sub parts.

Unit I

Human Values; Types, Features and Classification Sources of Value System Values across Cultures.

Unit II

Morality Norms, Beliefs, Attitude Moral Norms, Moral Values Moral Standards

Unit III

Professional Ethics; Nature, Characteristics and Needs Ethics V/s Morals and Values Ethico-Moral Action Ethical Codes, Ethical Practices

Unit IV

Nature and Dimensions of Attitude Components of Attitude Attitude Formation Functions of Attitude Changing Attitude

Unit V

Moral Values and Character-Building Character; Meaning, Important Components of Character Character Development.

Text Books:

- 1) Beteille Andre (1991), Society and Politics in India, Athlone Press, Latest edition
- 2) Chakraborty S. K. (1999), Values and Ethics for Organizations, oxford university press, Latest edition
- 3) Fernando, A.C. (2009), Business Ethics - An Indian Perspective, Pearson Education, India, Latest edition

Reference Books:

- 1) Charles D. Fleddermann (2012), "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, (Indian Reprint), Latest edition

BCA V Semester

BCA- 506 Information Technology Trends

Session

2020-21

Subject Nature	Compulsory
----------------	------------

Course objectives:

Course Objectives (CoB): The course is aimed at

To make aware students the changes in technologies,application and sytem around us.

Learning Outcomes: After this course students will eligible to-

1. get knowlwdge about modern communication syste

Learning Outcomes: After this course students will eligible to-

Unit I

Introduction and basic concepts of modern communication and telephony technology: CDMA, WLL, GSM, VOIP, Bluetooth, Wi-Fi, Communication Technology: 2G, 3G, 4G, 5G. Communication over Radio, Microwave systems, Communication satellites, Radar, Fiber optics, ISDN – their properties, Geographic Information System (GIS): Components of a GIS – Hardware, Software, Data, People, Methods, Working and application of GIS.

Unit II

Information Security - Introduction, Malicious Programs, Cryptography, Digital Signature, Firewall, Users Identification and Authentication, Security Awareness and policies, Application areas requiring security. Mobile Commerce: Introduction, Growth, Success stories of Mobile commerce, Technologies for mobile commerce, M-Commerce in India, Digital Marketing

Unit III

Data Warehouse and Data Marts: Introduction, Advantages of data warehouse, Data warehouse components, Data warehouse architecture and schemas. Big Data Concept, Data Mining: Introduction, Evolution of data mining, Data mining – verification versus discovery, Advantages of data mining, Technologies used in data mining.

Unit IV

Artificial Intelligence and Expert System: Concept of Artificial Intelligence and Expert System, Building of Expert System, Merits and Demerits of Expert System, Application of Expert System, Application of Artificial Intelligence

Unit V

Introduction to IoT Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Home automation, Industry applications, Surveillance and other IoT applications, Introduction to Virtual Reality: definition,

Text Books:

- 1) Fundamentals of Information Technology by Alex Leon & M. Leon, Vikas Publications, New Delhi.
- 2) Frontiers of Electronic Commerce by Ravi Kalakota, Andrew B. Whinston, Addison Wesley Longman Publication.
- 3) E-Commerce: An Indian Perspective (Second Edition) by S.J.P. T. Joseph, Prentice-hall Of India Pvt Ltd.
- 4) Security in Computing (Third Edition) by C.P.Pfleeger, S.L. Pfleeger, D.N. Shah, S.Ware, Prentice Hall 2002.
- 5) Mobile Communications, Joschen Schiller, Pearson Education.
- 6) Recent Magazines of Computers and Communication.
- 7) Cloud Computing PHI by Rao M.N.
- 8) Internet of Things McGrawHill by Raj Kamal

Reference Books:

- 1) Introduction to Information Technology - ITL Education Solutions Ltd., Seventh Impression, Pearson Education, 2008.
- 2) Data Mining Techniques - Arun K Pujari, University Press.
- 3) Enterprise Resource Planning 1/e - Alexis Leon, International edition-Tata McGraw Hill publication.
- 4) Concepts in computing - Kenneth Hoganson, First Indian Edition, Jones & Bartlett Publishers, Inc., 2010.
- 5) Artificial Intelligence - Elaine Rich, Kevin Knight, 2nd edition, McGraw Hill, 1991.
- 6) Computer Networks - Andrew S. Tanenbaum, 4th Edition, Pearson Education.

BCA VI Semester

BCA- 601 Operation Research

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective-

1. To analyze the different situation in the industrial/business scenario involving limited resources and finding the optimal solution.
2. knowledge about identify and development of research model.

Learning Outcomes: After this course students will eligible to-

1. identify and develop operation research model from the verbal description of the real system.
2. analyze the different operation research model that are needed to solve optimization problems.
3. understand the mathematical tools that are needed to solve business problems.

Examination Scheme-

Theory paper is of 40 marks. In which there is assignment of 10 marks.

Each theory question paper will contain 5 questions of 2 sub parts.

Introduction to Operations Research: Origin and Development of OR, nature of OR, characteristics of OR, Meaning, Scope of Operations Research and Decision making, Advantages and Limitations of OR, Application of OR, Phases of OR, OR Models.

Unit II

Linear Programming: Meaning of Linear Programming, Mathematical Formulation of Linear Programming Problems, Graphical Solution, Simplex Method, Dual Simplex. Advantages and limitations of LPP.

Unit III

Transportation Problems: Mathematical Model and Formulation, Initial Basic Feasible Solution, North West Corner Method, Least Cost Method, Vogel's Approximation Method, Optimal Solution (Minimization And Maximization) using Modified Distribution Method, Degeneracy in Transportation Problem.

Unit IV

Assignment Problem: Definition of Assignment Problem, comparison with Transportation Problem, formulation and solution of Assignment Problem using Hungarian Method (Minimization and Maximization), Travelling Salesman Problem.

Sequencing and Scheduling: Johnson's Algorithm for processing n jobs through 2 machines, Algorithm for processing n jobs through 3 or more machines, Processing 2 jobs through n

Text Books:

- 1) Gillet B.E., Introduction to Operation Research, Computer Oriented Algorithmic Approach, Tata McGraw-Hill publishing Co. Ltd., New Delhi.
- 2) P.K.Gupta & D.S. Hira, Operations Reserch, S. Chand & Co.

Reference Books:

- 1) Taha H.A., Operations Research: AN Introduction, Mc Millian Co., New York.
- 2) N.S. Kambo, Mathematical Programming Techniques, Affiliated East West Press Pvt. Ltd., New Delhi, 1984.
- 3) R. Pannesarvam, Operations Resaerch, Prentic Hall of India Pvt. Ltd., New Delhi, 2004.
- 4) S.D. Sharma, Operations Research, Kedar Nath & Co. Meerut.
- 5) Gupta, Kanti Swaroop, Gupta P.K. and Manmohan, Operations Research, Sultan Chand and Sons, New Delhi.

BCA VI Semester

BCA- 602 Internet And Web Technology Using Php

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective-

To understand the principle of creating effecting web pages using HTML,CSS and the concept of web designing and development using PHP and MYSQL.

Learning Outcomes: After this course students will eligible to-

1. Develop and understanding about the basics concept of web page design usingHTML,CSS.
2. Develop and understanding about the web site development usingPHP.
3. Create a powerful and dynamic web application using PHPand MYSQL.

Examination Scheme-

Theorypaperis of 50 marks. In which there is a practical of 25 marks.

Each theory question paper will contain 5 questions of 2 sub parts

Web Technology: Introduction to WWW, web browsers, web servers, HTTP, URL

HTML: Introduction, Objective, HTML Command Tags: Text, List, Table, creation of links,

A Brief History of PHP, PHP Characteristics, Installing and Configuring PHP on Windows, PHP Language Basics: Lexical Structure, Data Types, Variables, Expressions and Operators, Decision Statements, Flow Control Statements, Embedding PHP in Web Pages.

Strings: String Constants, Printing Strings, Accessing Individual Characters, String Handling Functions: length, Word count, string position, reverse, replace.

Maths: max, min, sqrt, sin, cos, tan, sinh, cosh, tanh, abs, count, ceil, round, floor, log, log10, pow() functions.

Arrays: Indexed Arrays, Associative Arrays, Identifying Elements of an Array, Storing Data in Arrays, Multidimensional Arrays, extracting multiple values, converting between arrays and variables, Traversing Arrays.

Unit III

Session: Session handling, creating session, storing values in session, accessing values from session, destroying session, Cookies: creating cooking, setting values, accessing cookies values, session cookie, persistent cookie, redirecting page.

Functions: Calling a Function, Defining a Function, Variable Scope, Function Parameters, Return Values, Variable Functions.

Object Oriented Programming Concepts: Classes, Objects, Member Functions Encapsulations, Inheritance, and Polymorphism, (only basic definition)

Form Handling in PHP: Setting Up Web Pages to Communicate with PHP, Handling Text Fields, Text Areas, Check box, Radio button, Submit, Reset, Button, Image Button, Select Box, input type email, password, date and url.

File Handling: Working with files: File Open and Read, File Create and Write, Reading and writing Character in file, reading entire file, Rename and Delete File, File Uploading.

Database Access: Using PHP to access a database, Introduction to MySQL, connectivity with MySQL.

L 'eJ!nd It fifl ari! <c> in; Jala t1] furni in hlySql] Performing CfiUI) Operatiun t sulk PHP

BCA VI Semester

BCA- 603 Computer Graphics And Multimedia

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective-

To objective of this course is to providing comprehensive introduction about computer graphics system, design algorithm, two D transformation, techniques of clipping, three-D graphics and three-D transformation.

Learning Outcomes: After this course students will eligible to-

1. Understand the basic terminology of Graphics
2. Learn about the basic input and output devices and their working
3. learn about the application of graphics (where graphics is used.)
4. Lerner will understand the implementation of different types of algorithm to draw different shapes.
- 5 learner will understand the different transformation, how we can see a image from different dimensions.

Examination Scheme-

Theory paper is of 50 marks. In which there is a practical of 25 marks.
Each theory question paper will contain 5 questions of 2 sub parts

Computer Graphics: Introduction, Application of Computer Graphics, Display Devices: Refresh Cathode -Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Flat Panel Displays. Video cards/display cards. Input Devices: Mouse, Trackball, Space ball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. Hardcopy Devices: Printers and Plotters.

Graphics Primitives: Line Generation Algorithms. DDA algorithm, Bresenham's algorithm. Circle Generation Algorithms: Midpoint Circle algorithm, Bresenham's circle generation algorithm. Displaying Lines, characters and polygon. Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm. Fundamentals of Aliasing. Antialiasing Technique.

Unit III

Clipping: Clipping operations. Point clipping. Line clipping: Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm. Polygon clipping: Sutherland-Hodgeman Algorithm, Weiler Atherton Algorithm. Text clipping, Exterior clipping.

Two Dimensional: Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear. Homogenous coordinate system, Composite transformations, Raster method of transformation. Two- Dimensional Viewing: Window to Viewport coordinates transformation.

Unit V

Multimedia: Introduction, Multimedia applications, Multimedia data and File formats, Multimedia tools. Advancements in the technology in Computer graphics and Multimedia.

Text Books:

- 1) Donald Hearn and M. Pauline Baker, *Computer Graphics: C++ version*, No. 1

Reference Books:

- 1) David F. Rogers, *Procedural Elements for Computer Graphics*, Tata Mc-Graw-Hill Publishing Company Ltd., New Delhi, 2001.
- 2) James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, *Computer Graphics: Principles and Practice in C*, Second Edition, Addison-Wesley Professional.
- 3) Zhigang Xiang, Roy A. Plastrock, *Schaum's outline of Theory and Problems of Computer Graphics*, Second Edition, Tata McGraw-Hill Professional, New Delhi.

BCA VI Semester

BCA- 604 Principle And Practices Of Management

Session 2020-21

Subject Nature	Compulsory
----------------	------------

Course Objective-

The course aims to help the students to be aware of the primary function and responsibilities of managers, and understand the environment of an organization.

Learning Outcomes: After this course students will be eligible to-

1. understand the concepts related to business.
 2. understand the roles, skills and functions of management.
- Understand the complexities associated with the management of resources in the organization.

Examination Scheme-

Theory paper is of 40 marks. In which there is assignment of 10 marks.

Each theory question paper will contain 5 questions of 2 sub parts.

Unit I

The Nature of Management: Definition and role of management, Functions of Manager, Scientific Management, Human Relations school of Management, Contingency Theory of Management.

Unit II

Planning: Nature and Purpose of Planning, Components of Planning, objective of Business Management by Objectives.

Unit III

Organizing: Nature of Purpose of Organizing, Departmentation, Span of management, Delegation of Authority, Line and Staff Relationships. Staffing: Nature of staffing, problems faced in staffing, process of staffing.

Unit IV

Directing Process: Principles of Direction, Problems in Human Relation, Strategies for Establishing Healthy Human Relations.

Unit V

Control: Meaning and Process of Control, Control Techniques.

Text Book:

- 1) "Principles of Management", Harold Koontz, O'Donnell and Heinz Weihrich, New York: McGraw Hill Book Co

Reference Books:

- 1) "Management", Stoner, Freeman and Gilbert Jr., PHI, 6th Ed.
- 2) "Organization and Management Concepts" R. D. Agarwal: New Delhi: Tata

BCA- PROGRAMME OUTCOMES

BCA programme has been designed to prepare graduates for attaining the following specific outcomes:

- An ability to apply knowledge of mathematics, computer science and management in practice.
- An ability to enhance not only comprehensive understanding of the theory but its application too in diverse field.
- The program prepares the young professional for a range of computer applications, computer organization, techniques of Computer Networking, Software Engineering, Web development, Database management and Advance Java
- An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability in multidisciplinary teams with positive attitude.
- An ability to communicate effectively.
- In order to enhance programming skills of the young IT professionals, the program has introduced the concept of project development in each language/technology learnt during semester.

Syllabus BCA

SEMESTER: 1

**SUBJECT: Digital Computer Organisation
21
105**

**YEAR: 2020-
COURSE CODE: BCA-**

**Max. Marks: 40
13**

Min Marks:

CC: 10

Course Objectives:

This course is intended to teach the basics involved in data representation and digital logic Circuits used in the computer system. This includes the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design. This course will also expose students to the basic architecture of processing, memory and i/o organization in a computer system.

Course Outcomes:

The student will be able to:

1. Identify, understand and apply different number systems and codes.
2. Understand the digital representation of data in a computer system.
3. Understand the general concepts in digital logic design, including logic elements, and their use In combinational and sequential logic circuit design.
4. Understand computer arithmetic formulate and solve problems, understand theperformance requirements of systems
5. Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra and simplify simple Booleanfunctions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.

6. Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters.

7. Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits

BCA-105-DIGITAL COMPUTER ORGANIZATION

Max. Theory Marks: 40

Min. Theory Marks:13

OBJECTIVES: The course covers the basic principles of computer hardware organization, peripherals, operations and their assembly. The course highlights the role of Number System, Logic Gates, Flip flops and Memory units in processor design. The students will understand basic computer organization which will act as the base of understanding other complex modern computer architectures like cloud. It will also prepare the students to understand the code generation process of compiler and develop efficient programs.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I

Block diagram of Computer, Stored program Concept, Word length and processing speed of the Computer, User interface, Hardware/Software Concepts, Microprocessor and Single chip microprocessor concepts.

Input and Output devices: Keyboard, mouse, joystick, scanner. Printers: printers and types of printers, plotters and display devices.

UNIT II

Number system and codes. Decimal, binary, octal, hexadecimal and their inter conversion. ASCII, grey code excess-3 code, BCD numbers, binary addition, subtraction, multiplication and division (1's and 2's compliment methods)

UNIT III

Logic gates: NOT, OR, AND, NAND, NOR, XOR, XNOR gates. Boolean Algebra, De Morgan's Theorem. Application of gates, half adder and full adder.

Boolean functions & truth table, Simplification of logical circuits using Boolean algebra, SOP, POS, and Karnaugh maps.

UNIT IV

Flip- Flop, Registers and counters, RS-flip flop, level clocked D,F/P edge triggered D flip flop , edge triggered JK flip flop , racing in F/F, JK masters-slave flip flop, buffer registers, shift registers, ripple counters, synchronous counters , ring counters, Mod Counters.

UNIT V

Computer Memory: memory cell, memory organization, Random Access Memory, Read Only Memory, PROM, EPROM, EEPROM, building large memories, magnetic hard disk, pen drive, Cache memory, optical disk.

Transfer of information between I/O devices, CPU and Memory.

BCA SEMESTER:1

PC SOFTWARE

Max. Marks:

40

Min Marks:

CC: 10

LEARNING OBJECTIVES:

After studying this unit, you should be able to understand:

Define a computer and its various parts.

Classify computer according to purpose, technology used, size and capacity.

Describe various Input and output devices.

Understand the concept of Office Automation.

Describe various components of a computer system.

Describe various generations of the computer.

Course Outcomes (COs):

Ability to use internet for searching information on web, sending e-mails and many other tasks.

Skill to work with MS-Word, Excel and PowerPoint.

Initiation into the process of writing business letters or job applications, tabulating data, preparing PPTs, etc. using MS-Office.

Bridge the fundamental concepts of computer with the present level of knowledge of the students.

BCA - 104: PC SOFTWARE

Maximum Marks: 50

Minimum Pass Marks: 17

UNIT I

MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows , icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel - display properties, adding and removing software and hardware, setting date and time, screen saver and appearance. Using windows accessories.

UNIT II

Documentation Using MS-Word - Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto-text, Autocorrect, Spelling and Grammar Tool, Document _ Dictionary, Page Formatting, Bookmark, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing , Styles, linking and embedding object, Template.

UNIT III

Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation.

UNIT IV

Database Management using MS Access: Creating Database, Tables, primary key, Relationship, Forms and Reports, DBMS Queries.

UNITY

Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object , Inserting Recorded Sound Effect or In-Built Sound Effect.

TEXT BOOK

Learn Microsoft Office - Russell A. Shultz - BPB Publication

REFERENCES BOOKS

1. Microsoft Office - Complete Reference - BPB Publication
2. Comter, G Marquis. Microsoft Office 2000: Professional Edition. BPS.
3. PC Software - Shree Sai Prakasha n, Meerut

Syllabus BCA

SEMESTER: 2

SUBJECT: Introduction to Information System

COURSE CODE: BCA- 204

Max. Marks: 40

Marks: 13

CC: 10

Course Objectives:

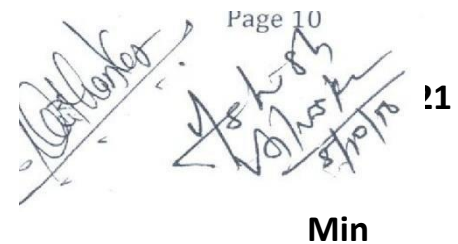
1. Information systems concepts
2. Information systems within organisations
3. Information and communications technologies
4. Systems development

Learning outcomes:

If you complete the course successfully, you should be able to:

1. Explain fundamental assumptions made in studying information and communications technologies in organizations as socio-technical systems in contrast to purely technical or managerial views
2. Debate the relevance of the sociotechnical approach and demonstrate this through the study of a number of practical business and administrative information systems within real organisations
3. Express a logical understanding of how the technical parts of computer-based information system work, their principal structures and components including contemporary technologies for information processing and communications
4. Explain the various functions of systems and network software and various classes of business-oriented application packages
5. Describe fundamental principals that can be applied to ensure that security and personal privacy is respected in information systems

Explain the tasks required when undertaking the establishment of a new



information system and be able to contrast alternative approaches to development.

BCA 205: INTRODUCTION TO INFORMATION SYSTEM

Max. Theory Marks: 50

Min. Theory Marks: 17

OBJECTIVES: The main objective of this course is to provide students with an overall understanding of the information systems and to highlight the importance of information systems in modern organizations. This course will help the student to understand different types of information systems, system development life cycle, communication systems and the concept of E-commerce.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT I: Introduction to Information System: Definition, Meaning of Information System, System Concept, Need to learn Information System, Competitive advantage, Careers in Information System. Fundamentals of Data Processing, Components of Computer system, Applications of Computer Based System.

UNIT II: A System Approach to Problem Solving: The Scientific Method, The System Approach, Understanding a Problem or opportunity, Developing & Implementing a solution, A System Solution Methodology, Applying the Solution Methodology. Types of Information Processing System: Overview of six major types of systems - Transaction Processing System, Office Automation System, Knowledge Work Systems, Management Information System, Decision Support Systems and Executive Support System.

UNIT III: System Concepts and The Information Systems Environment: The System Concept: Definition, Characteristics of a System, Central Objective, Element of a system, Types of Systems, The Systems Development Life Cycle: Recognition of Need, Feasibility Study, Analysis, Design, Implementation and The Role of System Analyst.

UNIT IV: The Meaning and use of MIS system in view of Business, Process of MIS, **System Design:** System Design Consideration, input/output design, forms design, file organization and database, data management, file design.

UNIT V:

E -Commerce: Introduction to E-Commerce, types of E-commerce, E-Commerce Applications, electronic payment systems. Overview of Communication System, Use and functioning of the internet, WWW, Digital Marketing, Search Engine Optimization.

Text Books:

1. Ralph Stair , "Principle of Information System", Thomson course technology.
2. Elias M. Awad, "System Analysis and Design", Galgotia Publishing Pvt. Ltd., New Delhi.

Reference Books:

1. James A Senn, "Analysis and Design of Information Systems", McGraw-Hill Publishing Company, Delhi.
2. Muneesh Kumar, "Business Information Systems", Vikas Publishing House Pvt. Ltd., New Delhi.
3. James A. O'Brien, "Management Information System", Galgotia Publications Pvt. Ltd. New Delhi.
4. Kenneth C. Laudon & Jane P. Laudon, "Management Information System", Prentice Hall of India Ltd., New Delhi

Subject Nature	Compulsory
-----------------------	-------------------

Course OBJECTIVES:

The objective of the course is to provide basic knowledge of operating system modules like process and memory management. The student after completion of the course will be able to understand the internal working of an operating system that will help in identifying and troubleshooting application errors.

Learning Outcome-

- Students will learn how Operating System is Important for Computer System.
- To make aware of different types of Operating System and their services.
- To learn different process scheduling algorithms and synchronization techniques to achieve better performance of a computer system.
- To know virtual memory concepts.
To learn secondary memory management

Examination Scheme-

- 1. The end of semester examination will be worth 10 marks having assessment .**
- 2.Each theory question paper will contain 5 question of 8 marks.**

Unit-No	Topics	CLO(Course Learning Outcomes)
Unit-1	Introduction to Operating Systems, Operating system services, multiprogramming, time sharing system, storage structures, system calls, multiprocessor system, Device Management, Device Drivers.	<p>After completion of this Unit students will be able to:</p> <ul style="list-style-type: none"> • Differentiate between multiprocessing, multiprogramming, and multitasking • They learn real life applications of Operating System in every field. • Understands the different services provided by Operating System at different level • Defining I/O systems, Device Management Policies and Secondary Storage Structure

Unit-2	Process concept, Basic concepts of CPU scheduling, Scheduling criteria, Scheduling algorithms, algorithm evaluation, multiple processor scheduling, real time scheduling I/O devices organization, I/O buffering.	After completion of this Unit students will be able to: <ul style="list-style-type: none"> • Differentiate between programs, processes and threads. • Understands the use of different process scheduling algorithm
Unit-3	Inter-process communication, precedence graphs, critical section problem, semaphores, Classical problems of synchronization.	After completion of this Unit students will be able to: <ul style="list-style-type: none"> • Explain the concepts covered in concurrency control, including mutual exclusion and synchronization, Inter-process communication.
Unit-4	Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection, recovery from deadlock, Methods for deadlock handling.	After completion of this Unit students will be able to <ul style="list-style-type: none"> • Understands the use of different synchronization techniques to avoid deadlock. • Solve Deadlock Detection Problems.
Unit-5	Concepts of memory management, logical and physical address space, swapping, contiguous and non- contiguous allocation, Concepts of virtual memory, demand paging, page replacement algorithms, allocation of frames, thrashing, demand segmentation.	After completion of this Unit students will be able to <ul style="list-style-type: none"> • They will learn different memory management techniques like paging, segmentation and demand paging etc.

Text book-

1. operating system concept-Addison veasley 4th edition A silberschartz and P. Galvin

Reference Book

1. Operating System by Deitel
2. Operating system ,4th edition, William Stallings, Pearson Education 2003.

Syllabus Outcomes

BCA I

English

Literature	The texts are meant for the development of comprehensive and analytical power. Text used to enhance literary taste among students.
Language	The objective of language is to give guideline for the development of skills like listening, speaking, reading and writing. It develops structure formation. Students learn vocabularies, phrases, idioms, in order to develop their skills.

Contents of Literature

1. Where the Mind is Without Fear
2. The Ideals of Indian Art 6
3. The Heritage of Indian Art
4. Life in Vedic Literature 16
5. The Ramanayana and Mahabharata
6. Freedom Movement in India
7. Dadi Salt March
8. Aspects of Indian Constitution
9. Individual Freedom
10. Fundamental Duties
11. Delhi in 1857
12. Rajah's Diamond
13. Tree
14. The Wonder that was India

Contents of Language

1. Reading Comprehension and Vocabulary
2. Paragraph Writing
3. Letter writing

4. Grammar – Articles, Pronouns, Tenses, Voice, Modals, Direct- indirect etc.
5. Some solved grammar Exercises

BCA III Semester

BCA- 301 Discrete Mathematics

Course outline- Set and Functions, Relations, Logics, Mathematical Reasoning, Boolean Algebra, Combinatorics, Recurrence Relation, Graph Theory, Language and Grammar.

Subject Nature	Compulsory
-----------------------	-------------------

1. Each theory paper is of 40 marks. In which there is an internal exam of 10 marks.

Course Objective-The course is designed to make students:

1. Enhance mathematical reasoning of students.
2. To understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.

Learning Outcomes:After this course students will eligible to-

- Use logical notation
- Perform logical proofs
- Apply recursive functions and solve recurrence relations
- Determine equivalent logic expressions
- Describe useful standard library functions, create functions, and declare parameters
- Use graphs and trees
- Apply basic and advanced principles of counting
- Define sets and sequences
- Calculate discrete probabilities.
- Design and evaluate Euler and Hamilton circuits.

1. Text Books :

1. *Discrete Mathematics and its Application*, Kenneth H. Rosen, McGraw Hill.
2. *Graph Theory with applications to Engineering and Computer Science*, Narsingh Deo, Prentice Hall of India.
3. *Discrete Mathematics*, Llipschutz and Lipson Schaum's outline series, Tata McGraw Hill Publication

2. Reference books :

1. *Discrete Mathematical Structures*, Kolman, Busby, Ross, Pearson.

UNIT- I

Algebra of logic:

Recall of Statements & Logical Connectives, Tautologies & Contradictions, Logical Equivalence, Propositions, Predicates, Quantifiers: Universal & Existential Quantifiers.

Boolean algebra:

Boolean Algebra and its Properties, De- Morgan's Laws.

UNIT- II

Sets and Functions: Introduction to set theory, set operations: Union, Intersection, Difference, Complement, fuzzy sets.

Mathematical reasoning: Introduction to Methods of proof, mathematical induction. Use of mathematical induction to solve different problems.

UNIT- III

Combinatorics: The basics of counting, The sum rule, The product rule, The Pigeonhole Principle, Permutations with repetitions, Permutations without repetitions, Circular Permutations, Applications of combinations. Applications of Combinatorics to solve Committee problems, word problems, puzzle problems etc. Advanced counting techniques, recurrence relations, solving recurrence relations.

UNIT- IV

Relations: Relation definition , Importance of relations in computer science, Relations and their properties, Unary relations , Binary relations, Ternary relations , n-ary relations and their applications, closures of relations, equivalence relations. Representing relations, composite relation. Operations on relations – union, intersection and join.

UNIT- V

Graph: Graph terminology, types of graph connected graphs, components of graph. Euler graph, Hamiltonian path and circuits, Graph coloring, Chromatic number.

Tree: Definition, types of tree (rooted, binary), properties of trees, binary search tree.

Languages and Grammars: Introduction, Phrase-Structure Grammars, Importance of grammar and language theory in Computer Science,

BCA III Sem

Course code- 302 Subject

- Data Structure Using C

Subject Nature	Compulsory
----------------	------------

Course Objective:

- To provide the knowledge of basic data structures and their implementations..
- To understand importance of data structures in context of writing efficient programs.
- To develop skills to apply appropriate data structures in problem solving.

Course Learning Outcomes:

On completion of this course, students will be able to:

- Choose appropriate data structure as applied to specified problem definition.
- handle operations like searching, insertion, deletion, traversing etc mechanism over various data structure.
- use linear and non linear data structure like stack, queue etc.
- Develop programming skills which require to solve given problem.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks. In which there is practical of 25 marks.

UNIT- I

Introduction to Data Structure & Linked List

Types of Data Structure, Arrays representation and address calculation, Strings, Recursion, ADT (Abstract Data type), Concept of Files, Operations with files, types of files.

Linked List as an ADT, Linked List Vs. Arrays, and Memory Allocation & De-allocation for a Linked List. Linked List operations, Types of Linked List, Implementation of Linked List. Application of Linked List- polynomial, sparse matrix.

UNIT- II

Stack & Queue

Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation

The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Circular Queue, Priority Queue, & De-queue, Application of Queues – Johnsons Algorithm, Simulation

UNIT- III

Tree

Basic trees concept, Binary tree representation, Binary tree operation, Binary tree traversal, Binary search tree implementation, Thread Binary tree, The Huffman Algorithm, Expression tree, Introduction to Multi-way search tree and its creation (AVL, B-tree, B+ tree)

S

UNIT- IV

Sorting & Searching

Sorting Concept, Shell Sort, Radix sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort
List Search, Linear Index Search, Index Sequential Search

UNIT- V

Hashing and Graph

Hash table, Hashed List Search, Hashing Methods, Collision Resolution Techniques, Graph-its type and representation, Graph Traversal: Depth First Search, Breadth First Search, shortest path algorithm (Dijkstra's Algorithm)

TEXT BOOKS:

1. Data Structures A Pseudocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan, second edition, CENGAGE Learning.
2. Data Structures using C, Reema Thareja, Oxford University press.
3. Introduction to Data Structure and its Applications Jean-Paul Tremblay, P. G. Sorenson

REFERENCE BOOKS:

1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures Using C, ISRD Group, Second Edition, Tata McGraw-Hill
3. Data Structure Using C, Balagurusamy
4. C & Data Structures, Prof. P.S. Deshpande, Prof. O.G. Kakde, Dreamtech press.
5. Data Structures, Adapted by: GAV PAI, Schaum's Outlines

BCA- 303- III SEMESTER

Subject-Object –oriented Programming using C++

Subject Nature	Compulsory
----------------	------------

Course Objective

After completion of this course, student will be

- Able to Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- Able to make use of objects and classes for developing programs.
- Able to use various object oriented concepts to solve different problems.

Learning Outcomes

On completion of the course the students should be able to:

- **Describe the meaning of the object-oriented paradigm, and create class hierarchies using the object-oriented design process.**
- **Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates**

Examination Scheme:

3. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
4. Each theory paper is of 50 marks . In which there is practical of 25 marks.

Unit-No	Course content
Unit-1	Introduction : OOP languages , characteristics of OOP languages , application of OOP , OOP paradigm. C++ concept: object ,class ,data abstraction , data encapsulation , inheritance and polymorphism. Static and dynamic binding , message passing ,benefits and disadvantage of OOP.
Unit-2	C++ Basics: Token, Expression and Control Structure Function in c++: main() function , function prototyping , call by Value, call by Reference,Returning by reference ,Inline Functions , default arguments , const arguments , variables and storage classes , function overloading ,Friend functions , Virtual functions.
Unit-3	Classes and objects: Defining a class, Defining a member Function(Inside and outside class), Constructor and Destructor , Parameterized constructor ,constructor with default arguments , copy constructor ,dynamic constructor. Private member functions, arrays within the class , static data members and functions, arrays of objects, objects as function arguments, returning objects from functions. String handling functions.
Unit-4	Data encapsulation , polymorphism ,operator overloading : overloading unary operators , overloading binary operators
Unit-5	Inheritance ,reusability of code through inheritance, type of inheritance : Single inheritance, multilevel inheritance , multiple inheritance , hierarchical inheritance , hybrid inheritance ,virtual base classes ,abstract classes , constructor in derived classes , nesting of classes ,pointers , virtual function , pure virtual function , Templates and Exception Handling

Text Book-

1. **Object Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane**
2. **E. Balagurusamy: Object Oriented Programming in c++**

References Book-

1. Herbert Schildt: C++ the complete Reference-TMH Publication
2. Robert Lafore: **Object Oriented Programming in c++**

BCA – Third Semester

BCA 304 – Unix Operating System

Max marks: 50 Min Marks :17

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives (CoB): The course is aimed at

1. To understand and make effective use of Unix/ linux utilities and shell scripting language to solve problems
2. To implement in C some standard Unix/linux utilities like mv,cp,ls etc...
3. To Develop the skills the necessary for systems programming including file system programming, process and signal management and inter-process communication
4. To develop the basic skills required to write network programs using sockets

Expected Course Outcome (CO): At the end of the course the student should be able to:

1. Explain the structure and functions of operating systems along with their components, types and working.
2. Make use of appropriate Unix/Linux commands for memory management, file management and directory management.
3. Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.
4. Elaborate the system calls for process management and file management.
5. Understand the basic set of commands and editors in Linux operating system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

BCA-304: UNIX OPERATING SYSTEM

Max. Marks: 50

Min. Marks: 17

COURSE OBJECTIVES: To understand the fundamental design of Unix Operating System and to become familiar with the various commands used for file handling, general utility, filters, scheduling and system administration. The students will be familiarized with the shell programming.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand the basics of Unix operating system and its features and some general utility commands.
2. Learn about the command shell, create own commands by combining commands, use pipes and redirection, set and manipulate ownership and permissions of files and directories.
3. Extract information using simple and advanced filters, and shell process.
4. Learn communication and scheduling of jobs, Unix editor, and the shell script.
5. Understand UNIX system administration.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Unix operating system, background, philosophy, help facility, The file system, structure of file system, Basic Commands related to file system: pwd, cd, mkdir, rmdir, ls, cp, rm, mv, cat. General utility commands: banner, cal, date, who, who am i, echo, printf, bc, who, uname, tty, stty, passwd.

UNIT- II

Utilities: more, od, file, wc, cmp, comm, diff, tar commands. I/O redirection. The Bourne shell: sh preceding a command by its own combining commands, pattern matching, echo, pipes, tees, shell variables and shell scripts. Basic file attributes, chmod command.

UNIT- III

Simple filters: pr, head, tail, cut, paste, sort, uniq, nl commands. Advanced filters: grep, egrep, fgrep, tr, join, sed, awk, filtering. The process: shell process, parent and children process status, system processes, multiple jobs, foreground and background, wait commands, premature termination of process, job execution with low priority, multiple jobs in foreground, shell layers, timing processes.

UNIT- IV

Communication and scheduling, address all users, delay Execution of jobs-later, periodically. Introduction to vi editor, Programming with shell: system variable, profile, conditional execution, script termination, Conditional and loop control statements, set and shift statement.

UNIT- V

System Administration: installing hardware and software, super user, security, user services, management operation, files system, administration backups.

TEXT BOOKS

1. Sumitabha Das, "Unix : Concepts and Applications", Third Edition, 2006, Tata Mc-Graw Hill

REFERENCE BOOKS:

1. ISRD Group, Basics of OS, UNIX and SHELL Programming, TMH (2006)
2. A User Guide to Unix System", Thomas Rebecca yate, Second Edition, 2002, Tata McGraw Hill.
3. Stephen Prata "Advanced Unix -A programmer's Guide".

Sandy
9/5/19

Wairahi

Smb

Rohit

COURSE CODE: BCA- 305

SUBJECT: Account and Financial Management

YEAR: 2020-21

Max. Marks: 40

Min Marks: 13

CC: 10

Subject Nature	Compulsory
----------------	------------

Course Objectives:

To enable the students to make use of financial accounting applications in the real life situation

Course Outcomes:

1. Acquire the basic knowledge of the terms such as, single entry system, statement of affairs, departmental accounts, inter departmental transfer, branch accounting, stock and debtors system, depreciation, hire purchase and installment purchase, down payment.
2. Understand the features of single entry system, difference between single entry and double entry system, need for departmental accounts, basis for allocation of expenses, difference between wholesale profit and retail profit, different methods of depreciation, features of hire purchase and installments system and difference between hire purchase and installment system.
3. Familiarizing the methods of preparation of single entry system of accounts, inter-department transfer at cost or selling price, preparation of branch accounts, preparation of accounts using various methods of depreciation and calculation of interest under hire purchase and installment system of accounting.
4. Develop analytical skills in single entry system of accounts, department trading and profit and loss account and balancesheets, stocks and debtors system and final accounts system and hire purchase trading account.
5. Evaluate the cost of departmental purchase, consolidated final accounts and default and repossession of goods under hire purchase system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 40 marks . In which there is assignment of 10 marks.

BCA-305: ACCOUNTING AND FINANCIAL MANAGEMENT

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES: To introduce the concept of Accounting and financial management. The student shall be introduced with the accounting standards, book keeping and preparation of journal, ledger and trial balance and other accounting related statements. Students will be introduced with accounting through software.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand basics of accounting, conventions, develop conceptual framework and recording of transactions in the book of accounts
2. Record the transactions in bank reconciliation statement and record transactions through one journal.
3. Understand the meaning of depreciation and need for charging depreciation, preparing the final accounts, and company's financial statement as per the Company's act.
4. Conceptualize Ratios and its need in decision making, cash flow statement and its utility to business as a technique of financial analysis.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.

Conceptual Frame work: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, brief review of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.

Recording of transactions: Journal, Ledger and Trial balance based on double entry book keeping.

UNIT- II

Subsidiary Books: Need, uses and types, Cash Book, Bank Reconciliation Statement.

BCA III sem

Communication skills

Aims and objectives

Subject Nature	Compulsory
----------------	------------

	Tites of the Units	Aims and Objectives
Unit 1	Definition of communication,importance,process,channel,and barrier of communicatio ,listening skills	Teachers aim to inculcate soft skills like body language,expression ,eye-contact, Aims to develop personality through soft skills
Unit 2	Advance communication,elements of IP communication,quizes,exercises and cases	It's a program worth for professionals,so this unit aims to cultivate excellence among employees whose skillful qualities help for hiring and promotion.
Unit 3	Group discussion-its definition,importance points to be born in mind while preparing;Do,s and Don's Interviews---types	To improve speaking skills .To get acquainted with various techniques for facing interview to get job offer.
Unit 4	Transactional analysis and Johari Window	The purpose of Transactional Analysis is to define awareness within the client and their stance on intimacy with others.
Unit 5	Report	Decision Making Tool: Today's complex business organizations require thousands of information. A Reports provide the required information a large number of important decisions in business or any other area are taken on the basis of information presented in the reports.

Examination Scheme:

1. Each theory paper is of 20 marks . In which there is assignment of 5 marks.

BCA-4th sem

BCA-401

Computer Oriented Numerical Methods

(Using c-language)

Max marks:50

Min marks-17

COURSE OBJECTIVES: The course aims to provide conceptual understanding of various numerical methods and to develop the understanding of implementing numerical methods in C programming language. The application of these numerical methods shall also be introduced.

COURSE OUTCOMES

On completion of the course students will be able to

1. Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Raphson method.
2. Understand the pitfalls of Gauss Elimination Method and Solve a Linear System of equation using Gauss Jordan and Gauss Seidel method.
3. Familiarize with finite precision computation.
4. Familiarize with numerical solutions of nonlinear equations in a single variable.
5. Implement numerical methods in programming language.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Numerical Computations, Computer Arithmetic: Floating Point Number Operations: Normalization and their consequences. Iterative Methods: Bisection Methods, False Position Methods, Newton Raphson Method, Secant Method, Graffes Root Squaring Method, Convergence of Solution

UNIT- II

Simultaneous Liner Equation: Solution of Simultaneous Liner Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, Triangularization Method & Pivoting Condensation, III Conditioned Equation & Refinement of solution
Curve Fitting: Curve Fitting Method, Least Curve Fitting, Non-Linear Curve Fitting.

UNIT- III

Difference Operators and Interpolation: - Definition of Forward, Backward, Shifting, Divided, Difference Central and Averaging Operators and their Relationships. Newton's Forward Interpolation Formula, Newton's backward Interpolation Formula Newton's divided Interpolation Formula. Lagrange's Interpolation Formula.

UNIT- IV

Numerical Differentiation: Numerical Differentiation using Newton's Forward Interpolation Formula, Newton's Backward Interpolation Formula Newton's divided Interpolation Formula.
Numerical Integration: General Quadrature Formula, Newton- Cote's Formula, Trapezoidal Rule, Simpson's one Third Rule, Simpson's Three Eight Rule.

UNIT- V

Numerical Solutions of Ordinary Differential Equations: Euler's Method, Euler's Modified Method, Taylor's Series Method, Picard's Method, Runge Kutta Second Order and Fourth order Method.

TEXT BOOK:

V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.

REFERENCE BOOKS:

I. S. S. Sastry, Introductory Methods of Numerical Analysis.

LEARNING OBJECTIVES:

Students will be able to:

- Write code to determine machine epsilon and perform root isolation
- Find roots using bisection, linear interpolation, Secant and/or Newton's methods
- Demonstrate understanding and ability to use Least squares and Lagrangian polynomials
- Demonstrate understanding and ability to write code for Gauss method, Ill-conditioned matrix, LU decomposition
- Demonstrate understanding and ability to write code for Jacobi and Gauss-Seidel iteration method
- Demonstrate understanding and ability to write code for Trapezoid rule, Simpson's rule, and Newton-Cotes

LEARNING OUTCOMES

- An ability to apply knowledge of computing and mathematics appropriate to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to communicate effectively with a range of audiences
- An ability to use current techniques, skills, and tools necessary for computing practice

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

BCA IV Sem

SEMESTER: 4th
SUBJECT: Software Engineering
COURSE CODE: BCA- 402

YEAR: 2020-21

Max. Marks: 40

Min Marks: 13

CC: 10

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES:

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Course Outcomes:

Upon completion of this course, the students will be able to:

1. Know develop the software project
2. Learn developing methodology of software project
3. Understand tools and techniques of software engineering
4. Verify and validate the problem of software programming
5. Maintain the quality of software project

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 40 marks . In which there is assignment of 10 marks.

UNIT- I

System concepts and Information system environment:

The system concept, characteristics of system, elements of system, The System Development Life Cycle, various information gathering tools, feasibility study, tools of system analysis, various methods of process design, form design methodologies.

UNIT- II

Software Process, Product and Project:

The Product: Software, Software Myths. The process: Software Engineering, A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component-Based Development, Fourth Generation Techniques, Software process and Project Metrics, Software measurement

UNIT- III

Software Project Planning and Design:

Software Project Planning: Project planning objectives, Decomposition Techniques, Cost Estimation, Empirical estimation models, The Make/Buy Decision..

Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT- IV

Software Quality Assurance and Testing:

Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, Mistake Proofing for Software, Testing Strategies: A strategic approach of software testing, White Box Testing, Black Box testing Techniques, strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging.

UNIT- V

Advanced Topics:

MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, applications of MIS in manufacturing sector and in-service sector. Decision Support System concepts, types of DSS.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press

Subject - Database Management System

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

- The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.
- This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration.

Course Learning Outcomes:

On completion of this course, students will be able to:

- Understand the advance concepts and the applications of database systems.
- Improve the database design by normalization.
- Convert the ER-model, EER model to relational tables, populate relational database and formulate SQL.
- List and explain the fundamentals of relational database system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

UNIT-I

Purpose of database system, views of data, data models: relation, network, hierarchical, instances and schemas, data dictionary, types of database languages: -DDL, DML, DCL, TCL, structure of DBMS, advantages and disadvantages of DBMS, 3-level architecture proposal: - external, conceptual & internal levels. Database System architecture, level of abstraction, Database users and DBA, Classification of Database Management Systems, Components of database system, Traditional File Systems vs. Modern Database Systems, Introduction and applications of DBMS, Data Independence

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship, relationship set & relationship types, attributes, role, participation and mapping constraints, keys, strong and weak entities, Advance ER Model Features: generalization, specialization & aggregation, reducing ER diagram to tables, Roles, Participation.

UNIT-III

Fundamentals of set theoretical notations: relations, domains, attributes, tuples, concept of keys: primary key, super key, alternate key, candidate key, foreign key, fundamentals of integrity rules: entity & referential integrity, extension and intention, relational algebra: select, project, Cartesian product, Evaluation of SQL, Between clause, Distinct Clause, Order by

Clause, Group by Clause, SQL Functions, Sub queries, Handling null value, Aggregate functions, set operations, Different types of Joins, View.

UNIT-IV

PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making, Working with Stored Procedure, Trigger, Cursor.

Relational Database design, Features of good relational database design, Codd's Rule, Integrity constraints.

UNIT-V

Functional Dependencies, Good & Bad Decomposition and Anomalies as a database: A consequences of bad design, Universal relation, Normalization: 1NF, 2NF, 3NF & BCNF normal forms, multivalued dependency, join dependency, 4NF, 5NF.

TEXT BOOK-

1. Database System Concepts by Henry Korth and A. Silberschatz.

REFERENCE BOOKS-

1. An Introduction to Database System by Bipin Desai
2. Simplified approach to DBMS, Prateek Bhatia, Gurvinder Singh, Kalyani Publication
3. Database Management System by Seema Kedar, Technical Publication

404- Programming with JAVA

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES: The subject introduces the fundamental concepts of Java programming. The students will be familiarized with the features of Java like platform independence, robustness etc. The course covers the concepts of class, objects, constructors, super class, overloading, overriding, packages and interfaces. The topic of database connectivity will be helpful to develop complete software solutions in Java.

Course Outcome:

- On completion of this course, The learners will able to-**
1. Understand the basic terminology of advance programming language
 2. Complete life cycle of programming language
 3. Learners will understand difference between c, cpp and java

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

UNIT I

Java features like Platform independent, architecture neutral, robust etc, Java Virtual machine concept, Introduction to class in java and methods, Primitive data types, operators, reserve words, local variables, examples and exercises.

UNIT II

Control statements: selection statements, Iteration statements, jump statements. String class, StringBuffer class, Math library, Arrays.

UNIT III

Definitions and naming conventions classes and class members, instance fields and methods, access modifiers: public, private, protected, final, static, abstract, volatile and transient, Initialization by constructor, Initialization by Default constructor, Multiple Definition of constructors, creation of objects, access modifiers, Inheritance, Super class, Sub class, Method overloading, Method overriding.

UNIT IV

Packages and Interfaces: defining package, finding packages and CLASSPATH. Access protection, importing packages, Exception Handling: fundamentals, exception types, try, catch and finally, throw, throws, creating own exception, exception by overriding, Thread, Multithreading example, synchronization, Java IO package, InputStream, OutputStream, File handling.

UNIT V

String Handling in java, Special string operators, String handling methods, Classes of java lang package, Java. util package and classes: Calendar, Date, ArrayList, Vector class, Taking input from user by Scanner class. Database connectivity: Types of driver, connecting database, crating table and running queries for insert, delete, update and selecting data and showing them to user. Examples and Exercises.

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective

After completion of this course, student will be

- Able to Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- Able to make use of objects and classes for developing programs.
- Able to use various object oriented concepts to solve different problems.

Learning Outcomes

On completion of the course the students should be able to:

- Describe the meaning of the object-oriented paradigm, and create class hierarchies using the object-oriented design process
- Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates

Examination Scheme-

1. The end of semester examination will be worth 25 marks having practical Problem.

2.Each theory question paper will contain 5 question of 10 marks.

Course content	CLO(course Learning outcomes)
<p>Introduction :OOP languages , characteristics of OOP languages , application of OOP , OOP paradigm. C++ concept: object ,class ,data abstraction , data encapsulation , inheritance and polymorphism. Static and dynamic binding , message passing ,benefits and disadvantage of OOP.</p>	<ul style="list-style-type: none"> • After completion of this Unit, student will be able to use various object oriented concepts to solve different problems. • Identify importance of object oriented programming and difference between structured oriented and object oriented programming features. • Understand the difference between top down and bottom up approach.
<p>C++ Basics: Token, Expression and Control Structure</p> <p>Function in c++: main() function , function prototyping , call by Value, call by Reference,Returning by reference ,Inline Functions , default arguments , const arguments , variables and storage classes , function overloading ,Friend functions , Virtual functions.</p>	<ul style="list-style-type: none"> • After completion of this Unit, student will be able to design, implement programs using the fundamental elements of C++ <ul style="list-style-type: none"> ○ Describe the fundamental components of a C++ program (e.g.,. source files, header files, main() function, functions, and libraries) ○ Explain and apply fundamental syntax rules for identifiers, declarations, expressions, statements, ○ Demonstrate an understanding of the overall syntax and semantics of C++ programs by writing small programs from

	<p>specifications given in class</p> <ul style="list-style-type: none"> ○ Modify and extend short programs that use standard conditional and iterative control structures ○ Choose appropriate conditional and iterative constructs for a given programming task.
<p>Classes and objects: Defining a class, Defining a member Function(Inside and outside class), Constructor and Destructor , Parameterized constructor ,constructor with default arguments , copy constructor ,dynamic constructor. Private member functions, arrays within the class , static data members and functions, arrays of objects, objects as function arguments, returning objects from functions. String handling functions.</p>	<ul style="list-style-type: none"> ● After completion of this Unit, student will be able to make use of objects and classes for developing programs. ● Able to implement constructors and class member function
<p>Data encapsulation , polymorphism ,operator overloading : overloading unary operators , overloading binary operators</p>	<ul style="list-style-type: none"> ● After completion of this Unit, student will be able to reuse code to another class. ● Able to same operator and same function in different task.
<p>Inheritance ,reusability of code through inheritance, type of inheritance : Single inheritance, multilevel inheritance , multiple inheritance , hierarchical inheritance , hybrid inheritance ,virtual base classes ,abstract classes , constructor in derived classes , nesting of classes</p>	<p>After completion of this Unit, student will be</p> <ul style="list-style-type: none"> ● able to reuse code to another class. ● able to apply Virtual and pure virtual & complex Programming situation

,pointers , virtual function , pure virtual function ,
Templates and Exception Handling

Text Book-

1. **Object Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane**
2. **E. Balagurusamy: Object Oriented Programming in c++**

References Book-

1. Herbert Schildt: C++ the complete Reference-TMH Publication
2. Robert Lafore: **Object Oriented Programming in c++**

Syllabus BCA

SEMESTER: 4th **SUBJECT: Software Engineering** **YEAR: 2020-21**
COURSE CODE: BCA- 402

Max. Marks: 40

Min Marks: 13

CC: 10

COURSE OBJECTIVES:

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Course Outcomes:

Upon completion of this course, the students will be able to:

1. Know develop the software project
2. Learn developing methodology of software project
3. Understand tools and techniques of software engineering
4. Verify and validate the problem of software programming
5. Maintain the quality of software project

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.

2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.

2. Software Engineering: A Primer, Waman S Jawadkar, Tata McGraw-Hill, 2008

3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005

4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press

BCA-402: SOFTWARE ENGINEERING

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES:

The course objectives are to :

- Acquire knowledge of basic Software Engineering methods and practices, and their appropriate application.
- Describe software engineering layered technology and Process frame work.
- Develop general understanding of software process models.
- Understand of software requirements and the SRS documents.
- Understand different software architectural styles.
- Understand implementation issues such as modularity and coding standards.
- Understanding of approaches to verification and validation and software testing approaches.
- Conceptualize quality issues and software evolution.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Gain basic knowledge and understanding of the analysis and design of complex systems.
2. Develop ability to apply software engineering principles and techniques.
3. Develop ability to develop, maintain and evaluate large-scale software systems.
4. Produce efficient, reliable, robust and cost-effective software solutions.
5. Manage time, processes and resources effectively
6. Apply software testing and quality assurance techniques at the module level, and understand these techniques at the system and organization level.
7. Understand common lifecycle processes
8. Prepare technical documentations and make presentations on various aspects of a software development project.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

System concepts and Information system environment:

The system concept, characteristics of system, elements of system, The System Development Life Cycle, various information gathering tools, feasibility study, tools of system analysis, various methods of process design, form design methodologies.

UNIT- II

Software Process, Product and Project:

The Product: Software, Software Myths, The process: Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component-Based Development, Fourth Generation Techniques, Software process and Project Metrics, Software measurement

UNIT- III

Software Project Planning and Design:

Software Project Planning: Project planning objectives, Decomposition Techniques, Cost Estimation, Empirical estimation models, The Make/Buy Decision.,

Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT- IV**Software Quality Assurance and Testing:**

Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, Mistake Proofing for Software, Testing Strategies: A strategic approach of software testing, White Box Testing, Black Box testing Techniques, strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging.

UNIT- V**Advanced Topics:**

MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, applications of MIS in manufacturing sector and in-service sector. Decision Support System concepts, types of DSS.

TEXT BOOKS

1. R. S. Pressman, "Software Engineering – A practitioner's approach", 6th ed., McGraw Hill Int. Ed., 2002.

REFERENCE BOOKS

1. Pankaj Jalote "Software Engg" Narosa Publications.
2. Ian Sommerville: Software Engineering 6/e (Addison-Wesley)
3. Richard Fairley: Software Engineering Concepts (TMH)
4. Elis Awad, "System Analysis & Design", Galgotia publications
5. W.S. Jawadekar: Management Information Systems, TMH Publication, India
6. Hoffer " Modern System Analysis & Design" 3e, Pearson Edition

Syllabus BCA

SEMESTER: 3

SUBJECT: Account and Financial Management

YEAR: 2020-21

COURSE CODE: BCA- 305

Max. Marks: 40

Min Marks: 13

CC: 10

Course Objectives:

To enable the students to make use of financial accounting applications in the real life situation

Course Outcomes:

1. Acquire the basic knowledge of the terms such as, single entry system, statement of affairs, departmental accounts, inter departmental transfer, branch accounting, stock and debtors system, depreciation, hire purchase and installment purchase, down payment.
2. Understand the features of single entry system, difference between single entry and double entry system, need for departmental accounts, basis for allocation of expenses, difference between wholesale profit and retail profit, different methods of depreciation, features of hire purchase and installment system and difference between hire purchase and installment system.
3. Familiarizing the methods of preparation of single entry system of accounts, inter-department transfer at cost or selling price, preparation of branch accounts, preparation of accounts using various methods of depreciation and calculation of interest under hire purchase and installment system of accounting.
4. Develop analytical skills in single entry system of accounts, department trading and profit and loss account and balance sheets, stocks and debtors system and final accounts system and hire purchase trading account.
5. Evaluate the cost of departmental purchase, consolidated final accounts and default and repossession of goods under hire purchase system.

BCA-305: ACCOUNTING AND FINANCIAL MANAGEMENT

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES: To introduce the concept of Accounting and financial management. The student shall be introduced with the accounting standards, book keeping and preparation of journal, ledger and trial balance and other accounting related statements. Students will be introduced with accounting through software.

UNIT- III

Depreciation: Meaning, need & importance of depreciation, methods of charging depreciation. (WDV & SLM).

Preparation of final accounts: Preparation of Trading Account, Profit & Loss Account, and Balance Sheet of sole proprietary business.

Introduction to Company Final Accounts: Important provisions of Companies Act, 1956 in respect of preparation of Final Accounts. Understanding of final accounts of a Company.

UNIT- IV

Cash flow statement (as per accounting standard), Analysis of Financial Statement-Financial ratio.

UNIT- V

Computerized Accounting: Computers and Financial application, Accounting Software packages. An overview of computerized accounting system - Salient features and significance, Concept of grouping of accounts, Codification of accounts, Maintaining the hierarchy of ledger, Generating Accounting Reports.

Note: Practical's are to be conducted using any Accounting Software for UNIT V.

TEXT BOOK:

1. Fundamentals of Accounting & Financial Analysis: By Anil Chowdhry (Pearson Education)

REFERENCE BOOKS:

1. Financial Accounting: By Jane Reimers (Pearson Education)
2. Accounting Made Easy: By Rajesh Agarwal & R Srinivasan (Tata McGraw -Hill)
3. Financial Accounting for Management: By Amrishi Gupta (Pearson Education)
4. Financial Accounting for Management: By Dr. S. N. Maheshwari (Vikas Publishing House)

BCA- 301 Discrete Mathematics

Course outline- Set and Functions, Relations, Logics, Mathematical Reasoning, Boolean Algebra, Combinatorics, Recurrence Relation, Graph Theory, Language and Grammar.

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective-The course is designed to make students:

1. Enhance mathematical reasoning of students.
2. To understand Discrete Mathematics such as sets, permutations, relations, graphs, trees and finite-state machines.

Learning Outcomes:After this course students will eligible to-

- Use logical notation
- Perform logical proofs
- Apply recursive functions and solve recurrence relations
- Determine equivalent logic expressions
- Describe useful standard library functions, create functions, and declare parameters
- Use graphs and trees
- Apply basic and advanced principles of counting
- Define sets and sequences
- Calculate discrete probabilities.
- Design and evaluate Euler and Hamilton circuits.

1. Text Books :

1. *Discrete Mathematics and its Application*, Kenneth H. Rosen, McGraw Hill.
2. *Graph Theory with applications to Engineering and Computer Science*, Narsingh Deo, Prentice Hall of India.
3. *Discrete Mathematics*, Lipschutz and Lipson Schaum's outline series, Tata McGraw Hill Publication

2. Reference books :

1. *Discrete Mathematical Structures*, Kolman, Busby, Ross, Pearson.

BCA III Sem

Course code- 302 Subject

- Data Structure Using C

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

- ❑ To provide the knowledge of basic data structures and their implementations..
- ❑ To understand importance of data structures in context of writing efficient programs.
- ❑ To develop skills to apply appropriate data structures in problem solving.

Course Learning Outcomes:

On completion of this course, students will be able to:

- ❑ Choose appropriate data structure as applied to specified problem definition.
- ❑ handle operations like searching, insertion, deletion, traversing etc mechanism over various data structure.
- ❑ use linear and non linear data structure like stack, queue etc.
- ❑ Develop programming skills which require to solve given problem.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

UNIT- I

Introduction to Data Structure & Linked List

Types of Data Structure, Arrays representation and address calculation, Strings, Recursion, ADT (Abstract Data type), Concept of Files, Operations with files, types of files.

Linked List as an ADT, Linked List Vs. Arrays, and Memory Allocation & De-allocation for a Linked List. Linked List operations, Types of Linked List, Implementation of Linked List, Application of Linked List- polynomial, sparse matrix.

UNIT- II

Stack & Queue

Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation

The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Circular Queue, Priority Queue, & De-queue, Application of Queues – Johnsons Algorithm, Simulation

UNIT- III

Tree

Basic trees concept, Binary tree representation, Binary tree operation, Binary tree traversal, Binary search tree implementation, Thread Binary tree, The Huffman Algorithm, Expression tree, Introduction to Multi-way search tree and its creation (AVL, B-tree, B+ tree)

UNIT- IV

Sorting & Searching

Sorting Concept, Shell Sort, Radix sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort
List Search, Linear Index Search, Index Sequential Search

UNIT- V

Hashing and Graph

Hash table, Hashed List Search, Hashing Methods, Collision Resolution Techniques, Graph-its type and representation, Graph Traversal: Depth First Search, Breadth First Search, shortest path algorithm (Dijkstra's Algorithm)

TEXT BOOKS:

1. Data Structures A Pseudocode Approach with C, Richard F. Gilberg & Behrouz A. Forouzan, second edition, CENGAGE Learning.
2. Data Structures using C, Reema Thareja, Oxford University press.
3. Introduction to Data Structure and its Applications Jean-Paul Tremblay, P. G. Sorenson

REFERENCE BOOKS:

1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures Using C, ISRD Group, Second Edition, Tata McGraw-Hill
3. Data Structure Using C, Balagurusamy
4. C & Data Structures, Prof. P.S. Deshpande, Prof. O.G. Kakde, Dreamtech press.
5. Data Structures, Adapted by: GAV PAI, Schaum's Outlines

BCA- 303- III SEMESTER

Subject-Object –oriented Programming using C++

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective

After completion of this course, student will be

- ☐ Able to Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- ☐ Able to make use of objects and classes for developing programs.
- ☐ Able to use various object oriented concepts to solve different problems.

Learning Outcomes

On completion of the course the students should be able to:

- ☐ **Describe the meaning of the object-oriented paradigm, and create class hierarchies using the object-oriented design process.**
- ☐ **Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates**

Examination Scheme:

3. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
4. Each theory paper is of 50 marks . In which there is practical of 25 marks.

Unit-No	Course content
Unit-1	Introduction : OOP languages , characteristics of OOP languages , application of OOP , OOP paradigm. C++ concept: object , class , data abstraction , data encapsulation , inheritance and polymorphism. Static and dynamic binding , message passing , benefits and disadvantage of OOP.
Unit-2	C++ Basics : Token, Expression and Control Structure Function in c++ : main() function , function prototyping , call by Value, call by Reference, Returning by reference , Inline Functions , default arguments , const arguments , variables and storage classes , function overloading , Friend functions , Virtual functions.
Unit-3	Classes and objects : Defining a class, Defining a member Function (Inside and outside class), Constructor and Destructor , Parameterized constructor , constructor with default arguments , copy constructor , dynamic constructor. Private member functions, arrays within the class , static data members and functions, arrays of objects, objects as function arguments, returning objects from functions. String handling functions.
Unit-4	Data encapsulation , polymorphism , operator overloading : overloading unary operators , overloading binary operators
Unit-5	Inheritance , reusability of code through inheritance, type of inheritance : Single inheritance, multilevel inheritance , multiple inheritance , hierarchical inheritance , hybrid inheritance , virtual base classes , abstract classes , constructor in derived classes , nesting of classes , pointers , virtual function , pure virtual function , Templates and Exception Handling

Text Book-

1. **Object Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane**
2. **E. Balagurusamy: Object Oriented Programming in c++**

References Book-

1. Herbert Schildt: C++ the complete Reference-TMH Publication
2. Robert Lafore: **Object Oriented Programming in c++**

BCA – Third Semester

BCA 304 – Unix Operating System Max

marks: 50 Min Marks :17

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives (CoB): The course is aimed at

1. To understand and make effective use of Unix/ linux utilities and shell scripting language to solve problems
2. To implement in C some standard Unix/linux utilities like mv,cp,ls etc...
3. To Develop the skills the necessary for systems programming including file system programming, process and signal management and inter-process communication
4. To develop the basic skills required to write network programs using sockets

Expected Course Outcome (CO): At the end of the course the student should be able to:

1. Explain the structure and functions of operating systems along with their components, types and working.
2. Make use of appropriate Unix/Linux commands for memory management, file management and directory management.
3. Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.
4. Elaborate the system calls for process management and file management.
5. Understand the basic set of commands and editors in Linux operating system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

BCA-304: UNIX OPERATING SYSTEM

COURSE OBJECTIVES: To understand the fundamental design of Unix Operating System

ated to familiar with the various commands used for file handling, General utility filters. s kJulin8 and system administration. The students will & familiar with the shell

COURSE OUTCOMES:

on completion of the course students will be able to

1. **Understand** the basics of Unix operating system and its features and some general utilities
2. Learn about the command shell, create or modify commands by combining commands, use @ r at redir. sex and manipulate ownership and permissions of files and directories.
3. Extract information using simple and advanced filters, and shell process,
4. Learn communication and scheduling of jobs, Unit editor, and the shell script.
5. Understand UNIX system administration.

NOTE:

The examiner shall set one question from each unit. Every question will be in three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of theoretical

conceptual/analytical/ theoretical questions.

UNIT-I

Unix origins system, background, philosophy, help facility, The file system, structure of file system, Basic Commands related to file system : pwd, cd, mkdir, find, ls, cp, rm, mv, cat. General utility commands: banner, cal, date, who, zcat, am i, echo, printf, be, who, unalias, tty, stty, passwd.

Uttluss: more, ad, fije, wr, cotp, amen, d ll. Mr commends. I/O redizection. Tfie
goumc s|te|]: sh preceding a command by its own combining commands, palm
packing, echu, pipes, ices. vfiu11 variables and shell scnpts. Bai file amit'utei,
chmnd torrrtrand.

SirtzpTu fiJteza: pre heed, a•IT, wt, Pete. son, uniq, cl commands. Advanced
films: grep, cup. fgrep. D'. /DIPI, sod. gw/ filtctg. The process: sheIT pi'oocss,
patent and children proeuss sUrus, system processes, multiple jobs , Aground
timing processes.

BCA Scheme Effective

8 or Later

Page 10

and background, wait corzmatnde, pre mxtwr iermtnarion of process, jo6
ex•wtio<i with tow prio ig', muJcp|e jobs in Foreground, shell layers,

UJHT-TV

Communication and scheduling, address sll users delay pxv.i aik+ nf johs-later.
Introduction to vi editor, Programming with periodical 1 \.sh<1l. spam valuable,
grcfile, cond 1inn^l

@NOD, Wlp ur ination, fondioool and loop control statements, set and shift statement.

System Administmtion: tnstal1iog bantwaze and sofr'^ae, ^P^ ^^^● '^^**● sctv'ces.

ma»agcment opcz8lion, files seem, eJdmlnl9Wtto» bacru 5.

TEXT BOOKS

t. set iiabha Des, "Uniz : Concepts and ApplyC tiolts ' , Third Edition 2 Melt .my
06 'i'Um

Hill

REErznENcE aoux

IMRO Gruup, gg# off.l2, T NIX and SHELL ytogtarnming, TffH
{2006} Data McGraw

2. A l.eler Guide la Unix S' stcrn", Thomas Rcbme fair. Second
Edition, **

3. Stephen Prata "Advanced Unix -A programmer's Guide".

Raitala

Smith

2018 or Later

Page 11

BCA SEMESTER: 3

SUBJECT: Account and Financial Management

YEAR: 2020-21

COURSE CODE: BCA- 305

Max. Marks: 40

Min Marks: 13

CC: 10

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

To enable the students to make use of financial accounting applications in the real life situation

Course Outcomes:

1. Acquire the basic knowledge of the terms such as, single entry system, statement of affairs, departmental accounts, inter departmental transfer, branch accounting, stock and debtors system, depreciation, hire purchase and installment purchase, down payment.
2. Understand the features of single entry system, difference between single entry and double entry system, need for departmental accounts, basis for allocation of expenses, difference between wholesale profit and retail profit, different methods of depreciation, features of hire purchase and installments system and difference between hire purchase and installment system.
3. Familiarizing the methods of preparation of single entry system of accounts, inter-department transfer at cost or selling price, preparation of branch accounts, preparation of accounts using various methods of depreciation and calculation of interest under hire purchase and installment system of accounting.
4. Develop analytical skills in single entry system of accounts, department trading and profit and loss account and balance sheets, stocks and debtors system and final accounts system and hire purchase trading account.
5. Evaluate the cost of departmental purchase, consolidated final accounts and default and repossession of goods under hire purchase system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 40 marks . In which there is assignment of 10 marks.

BCA-305: ACCOUNTING AND FINANCIAL MANAGEMENT

Max. Marks: 40

Min. Marks: 13

COURSE OBJECTIVES: To introduce the concept of Accounting and financial management. The student shall be introduced with the accounting standards, book keeping and preparation of journal, ledger and trial balance and other accounting related statements. Students will be introduced with accounting through software.

COURSE OUTCOMES:

On completion of the course students will be able to

1. Understand basics of accounting, conventions, develop conceptual framework and recording of transactions in the book of accounts
2. Record the transactions in bank reconciliation statement and record transactions through one journal.
3. Understand the meaning of depreciation and need for charging depreciation, preparing the final accounts, and company's financial statement as per the Company's act.
4. Conceptualize Ratios and its need in decision making, cash flow statement and its utility to business as a technique of financial analysis.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Introduction: Financial Accounting-definition and Scope, objectives of Financial Accounting, Accounting v/s Book Keeping Terms used in accounting, users of accounting information and limitations of Financial Accounting.

Conceptual Framework: Accounting Concepts, Principles and Conventions, Accounting Standards concept, objectives, benefits, brief review of Accounting Standards in India, Accounting Policies, Accounting as a measurement discipline, valuation Principles, accounting estimates.

Recording of transactions: Journal, Ledger and Trial balance based on double entry book keeping.

UNIT- II

Subsidiary Books: Need, uses and types, Cash Book, Bank Reconciliation Statement.



BCA III sem Communication

skills Aims and objectives

Subject Nature	Compulsory
-----------------------	-------------------

	Titles of the Units	Aims and Objectives
Unit 1	Definition of communication, importance, process, channel, and barrier of communication, listening skills	Teachers aim to inculcate soft skills like body language, expression, eye-contact, Aims to develop personality through soft skills
Unit 2	Advance communication, elements of IP communication, quizzes, exercises and cases	It's a program worth for professionals, so this unit aims to cultivate excellence among employees whose skillful qualities help for hiring and promotion.
Unit 3	Group discussion-its definition, importance points to be born in mind while preparing; Do, s and Don's Interviews---types	To improve speaking skills .To get acquainted with various techniques for facing interview to get job offer.
Unit 4	Transactional analysis and Johari Window	The purpose of Transactional Analysis is to define awareness within the client and their stance on intimacy with others.
Unit 5	Report	Decision Making Tool: Today's complex business organizations require thousands of information. A Reports provide the required information a large number of important decisions in business or any other area are taken on the basis of information presented in the reports.

Examination Scheme:

1. Each theory paper is of 20 marks . In which there is assignment of 5 marks.

BCA-4th

sem

BCA-401

**Computer Oriented Numerical
Methods (Using c-language)**

Max marks:50

Min marks-17

COURSE OBJECTIVES: The course aims to provide conceptual understanding of various numerical methods and to develop the understanding of implementing numerical methods in C programming language. The application of these numerical methods shall also be introduced.

COURSE OUTCOMES

On completion of the course students will be able to

1. Compute solution of algebraic and transcendental equation by numerical methods like Bisection method and Newton Raphson method.
2. Understand the pitfalls of Gauss Elimination Method and Solve a Linear System of equation using Gauss Jordan and Gauss Seidel method.
3. Familiarize with finite precision computation.
4. Familiarize with numerical solutions of nonlinear equations in a single variable.
5. Implement numerical methods in programming language.

NOTE:

The examiner shall set one question from each unit. Each question will have three sub parts. The students will attempt any two sub-parts of a question. All questions carry equal marks. The question paper will be a balanced combination of numerical/ conceptual/analytical/ theoretical questions.

UNIT- I

Numerical Computations, Computer Arithmetic: Floating Point Number Operations, Normalization and their consequences. Iterative Methods: Bisection Methods, False Position Methods, Newton Raphson Method, Secant Method, Graffes Root Squaring Method, Convergence of Solution

UNIT- II

Simultaneous Liner Equation: Solution of Simultaneous Liner Equation – Gauss Elimination Method, Gauss – Seidal Method, Gauss – Jordan Elimination Method, Triangularization Method & Pivoting Condensation, III Conditioned Equation & Refinement of solution
Curve Fitting: Curve Fitting Method, Least Curve Fitting, Non-Linear Curve Fitting.

UNIT- III

Difference Operators and Interpolation: - Definition of Forward, Backward, Shifting, Divided, Difference Central and Averaging Operators and their Relationships. Newton's Forward Interpolation Formula, Newton's backward Interpolation Formula Newton's divided Interpolation Formula. Lagrange's Interpolation Formula.

UNIT- IV

Numerical Differentiation: Numerical Differentiation using Newton's Forward Interpolation Formula, Newton's Backward Interpolation Formula Newton's divided Interpolation Formula.
Numerical Integration: General Quadrature Formula, Newton- Cote's Formula, Trapezoidal Rule, Simpson's one Third Rule, Simpson's Three Eight Rule.

UNIT- V

Numerical Solutions of Ordinary Differential Equations: Euler's Method, Euler's Modified Method, Taylor's Series Method, Picard's Method, Runge Kutta Second Order and Fourth order Method.

TEXT BOOK:

V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall, India.

REFERENCE BOOKS:

I. S. S. Sastry, Introductory Methods of Numerical Analysis.

Subject Nature

Compulsory

LEARNING OBJECTIVES:

Students will be able to:

- Write code to determine machine epsilon and perform root isolation
- Find roots using bisection, linear interpolation, Secant and/or Newton's methods
- Demonstrate understanding and ability to use Least squares and Lagrangian polynomials
- Demonstrate understanding and ability to write code for Gauss method, Ill- conditioned matrix, LU decomposition
- Demonstrate understanding and ability to write code for Jacobi and Gauss-Seidel iteration method
- Demonstrate understanding and ability to write code for Trapezoid rule, Simpson's rule, and Newton-Cotes

LEARNING OUTCOMES

- An ability to apply knowledge of computing and mathematics appropriate to the discipline
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
- An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
- An ability to communicate effectively with a range of audiences
- An ability to use current techniques, skills, and tools necessary for computing practice

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

BCA IV Sem

SEMESTER: 4th
SUBJECT:
COURSE CODE: BCA- 402

Software Engineering

YEAR: 2020-21

Max. Marks: 40

Min Marks: 13

CC: 10

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES:

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and Maintenance processes are conducted in a software project.

Course Outcomes:

Upon completion of this course, the students will be able to:

1. Know develop the software project
2. Learn developing methodology of software project
3. Understand tools and techniques of software engineering
4. Verify and validate the problem of software programming
5. Maintain the quality of software project

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 40 marks . In which there is assignment of 10 marks.

UNIT- I

System concepts and Information system environment:

The system concept, characteristics of system, elements of system, The System Development Life Cycle, various information gathering tools, feasibility study, tools of system analysis, various methods of process design, form design methodologies.

UNIT- II

Software Process, Product and Project:

The Product: Software, Software Myths. The process: Software Engineering, A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Software Process Models, Component-Based Development, Fourth Generation Techniques, Software process and Project Metrics, Software measurement

UNIT- III

Software Project Planning and Design:

Software Project Planning: Project planning objectives, Decomposition Techniques, Cost Estimation, Empirical estimation models, The Make/Buy Decision..

Software Design: Design Principles, Cohesion & Coupling, Design notation and specification, structure design methodology.

UNIT- IV

Software Quality Assurance and Testing:

Software Quality Assurance: Quality Concepts, Software Quality Assurance, Software Reviews, Formal Technical Reviews, Formal Approaches to SQA, Software Reliability, Mistake Proofing for Software, Testing Strategies: A strategic approach of software testing, White Box Testing, Black Box testing Techniques, strategic issues, unit testing, integration testing, validation testing, system testing, the art of debugging.

UNIT- V

Advanced Topics:

MIS & DSS: Introduction to MIS, long range planning, development and implementation of an MIS, applications of MIS in manufacturing sector and in-service sector. Decision Support System concepts, types of DSS.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, sixth edition McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, seventh edition, Pearson education.

REFERENCE BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press

BCA IV Sem
Course code- 403

Subject - Database Management System

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

- The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.
- This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration.

Course Learning Outcomes:

On completion of this course, students will be able to:

- Understand the advance concepts and the applications of database systems.
- Improve the database design by normalization.
- Convert the ER-model, EER model to relational tables, populate relational database and formulate SQL.
- List and explain the fundamentals of relational database system.

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.
2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

UNIT-I

Purpose of **database** system, views of *data*, data models: relation, network, hierarchical. Instances and schemas, data dictionary, types of database languages: -D, DC, DM, L, CCCL, 'I'm 1.. structure of DBMS. Advantages and disadvantages of GRM, 3-level architecture proposal : - external, conceptual & internal levels. Database System architecture, level of abstraction. Database users and DBA, Classification of Database Management Systems. Components: i'

Database system, Traditional File Systems vs. Modern Database System. Introduction

Applications of DBMS. Data Independence

UNIT-II

Entity relationship model as a tool of conceptual design: entities & entities set, relationship, relationship set & relationship types, attributes, role, participation and mapping constraints, keys, strong and weak entities, Advanced ER Model Features: generalization, specialization & aggregation, reducing ER diagram to tables, Roles, Participation.

Fundamentals of theoretical joins. Introduction.

Join attributes. Tuple. > join

Algebra: primary key, super key, alternate key, candidate key, foreign key, fundamental attributes:

entity & referential integrity, constraints and intention, relational algebra

select, project, Cartesian product. Evaluation of SQL, Between clause, Distinct clause. 11.1.1.1

Clause. Join by Clause, SQL Functions, Sub queries, Handling null value, Aggregate functions

operations. Different types of Joins. View

PL/SQL Programming using Oracle, Oracle Data types, Looping and Decision Making. Working with Stored Procedure, Trigger, Cursor.

Relational Database design. Features of good relational database design. Codd's Rule. Integrity

Functional dependencies, candidate keys and normal forms

.. nscptiencs o' bed design, niversal
rel at ion. Lot mal iznti on. I f, _ I . 3 { 11 C
1i' i rri 1.1 Sri-us, m u lti vall3ed dependency. join dependen
ency. 4N F, SN F.

Database System Concepts by Henry Korth and A. Silberschatz.

Introduction to database System by Bipin Deem

2. fi i rnp l ificd appi oach to D f3M S, Prateek Bhai ia, Gurv inder
3. Singh, Kal j an i 1*ul l ie..it ion l >atub<ase Management System
by SeernaKedar. Technical Pttblicat ion

BCA IV Sem

404- Programming with JAVA

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES: The subject introduces the fundamental concepts of Java programming. The students will be familiarized with the features of Java like platform independence, robustness etc. The course covers the concepts of class, objects, constructors, super class, overloading, overriding, packages and interfaces. The topic of database connectivity will be helpful to develop complete software solutions in Java.

Course Outcome:

On completion of this course, The learners will able to- 1.Understand

the basic terminology of advance programming language

2. Complete life cycle of programming language

3. Learners will understand difference between c, cpp and java

Examination Scheme:

1. Each theory question paper will contain 5 questions of 3 sub part of 10 marks.

2. Each theory paper is of 50 marks . In which there is practical of 25 marks.

UNIT I

Java features like Platform independent, architecture neutral, robust etc, Java Introduction to class in Java and methods. Primitive data types. Operators. Arithmetic operators. Local variables. Examples and exercises.

Control statements: Selection statements. Iteration statements, jump statements. Formatting class.

String, StringBuffer, StringBuffer, StringBuffer.

UNIT III

Definitions and naming conventions classes and class members, instance fields and methods, access modifiers: public, private, protected, final, static, abstract, volatile and transient, Initialization by constructor, Initialization by Default constructor, Multiple Definition of constructors, creation of objects, access modifiers, Inheritance, Super class, Sub class, Method overloading, Method overriding.

UNIT IV

Packages and Interfaces: defining package, finding packages and CLASSPATH. Access

modifiers, importing packages, Exception Handling: fundamentals, exception types, try, catch and finally, throw, throws, creating own exception, exception by overriding, Thread, synchronization, Java IO package, InputStream, OutputStream. I/O

handling in Java, Special string operators, String handling methods, Class package, Java. util package and classes: Calendar, Date, ArrayList, Vector class, Taking input from user by Scanner class. Database connectivity: Types of driver, connecting database, creating queries for insert, delete, update and selecting data and showing them to user. Exercises.

B.C.A. IV Code 405

Syllabus and outcome of Environmental Awareness of Green Computing

Course Outcomes

Students understand Green IT with different dimensions and strategies. It gives concept of how to manage the green IT. They learn various laws, standard and protocols for regulating green IT.

It helps in identifying the various key sustainability and green IT trends.

Course Contents

Unit I

Study of Environment and ecology and Environmental Pollution

Unit II

Environment and social problems and Role of mankind in conserving natural resources.

Unit III

Fundamentals of Green IT

Unit IV

Green Assets and Power Problems

Unit V

Green Supply Chain and Green PC

Code 406

B.C.A. IV Sem

Course Outcomes of Entrepreneurship

Texts – Students develop their innovative and creative skills after acquiring guideline from the texts. They master their oral and presentation skills and establish a foundation of confidence to act for new start-up.

This subject gives brighter chance in job opportunities.

Course Contents

Unit I

Concept of Entrepreneurship Development evolution of the concept of Entrepreneur, Entrepreneur Vs Intrapreneur etc.

Unit II

Creating Entrepreneurial Venture, Business planning process, Environmental Analysis

Unit III

Technical, Financial, Marketing, Personnel and Management

Unit IV

Managerial roles and functions in a small business, Designing and redesigning, Business processes

Unit V

Role of central government in promoting Entrepreneurship

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Examination Scheme :

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 29	Theory maximum marks - 28	Theory maximum marks - 28
CCE maximum marks - 05	CCE maximum marks - 05	CCE maximum marks -05
Practical maximum marks - 50		

Course Objective-

1. Physical Chemistry is a branch of chemistry that studies the physical and material properties of a chemical system or chemical process.
2. Chemistry is a big part of your everyday life. You find chemistry in food, the air, cleaning chemicals, your emotions and literally every object you can see or touch.
3. Inorganic compounds are used as catalysts, pigments, coatings, surfactants, medicines, fuels and more oxygen is both organic and inorganic compound but the oxidation itself has inorganic chemistry mechanism.
4. The use of organic compounds has simplified human life. The significance of organic compounds in daily life and industry can be stated in the following way. Food vitamins, proteins, sugar, wheat, lipids and other organic compounds.

Learning Outcomes –

1. Colloids are used for electrical precipitation of smoke, purification of drinking water, medicine, tanning, cleansing action of soap and detergent, photographic plates and films, Rubber Industry, in disinfectant, metallurgy, colloidal graphite. artificial rain etc.

2. Chemical equilibrium is a state in the course of a chemical reaction where the concentrations of both products and reactants reach the limit which prevents further deviation.
3. When you understand a mathematical concept you have essentially reached an upper tier in math that allows you to think and process abstractly.
4. Ideal gases are used to determine ideal efficiencies of engine and in various thermal equipments to determine various output parameters theoretically
5. The gaseous state is the easiest to study. A change in temperature results in evident changes in other quantities like volume and pressure.
6. Seven - segment displays are commonly used in digital clocks, clock radios, time wrist watches and calculators.

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year
Paper second

Title of the paper: Inorganic chemistry

Nature of the paper: Compulsory

1. The atomic structure of an element refers to the constitution of its nucleus and the arrangement of the electrons around it. Primarily, the atomic structure of matter is made up of protons, electrons and neutrons.
2. The periodic table is useful for modern students because it helps predict the types of chemical reactions that a particular element is likely to participate in. Rather than memorizing facts and figures for each element, students need only glance at the table to learn much about the reactivity of an element, whether it is likely to conduct electricity, whether it is hard or soft, and many other characteristics.
3. The strength of the attractive forces depends on the charge and size of the ions that compose the lattice and determines many of the physical properties of the crystal.
4. Inert atmospheres, which are commonly used for arc welding, specimen protection, and chemical reaction prevention, are created using noble gases. Neon lights and krypton headlights, as well as lasers, contain the elements. Superconducting magnets are cooled with helium, which is also used in balloons and deep-sea diving air tanks.
5. Silicates are the most abundant class of minerals on Earth. Sand and quartz crystals are silicates, and silicon is its central part. Because of their unique properties, silicates have many cool technological uses.

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year
Paper Third

Title of the paper: Organic chemistry

Nature of the paper: Compulsory

1. To understand structure and bonding, students need to know about the orbital model of the atom, plus covalent, ionic and metallic bonding:
2. The purpose of the IUPAC system of nomenclature is to establish an international standard of naming compounds to facilitate communication. The goal of the system is to give each structure a unique and unambiguous name, and to correlate each name with a unique and unambiguous structure.
3. Cyclo-alkanes are also called cycloparaffins. They are Alicyclic Compounds i.e. they are both aliphatic and cyclic compounds, and their properties are almost similar to alkanes.
4. The alkenes are also too useful in the chemical industry for the manufacture of plastics and many other chemicals to be used as fuels.
5. In organic chemistry, an alkyne is an unsaturated hydrocarbon containing at least one carbon-carbon triple bond. Like other hydrocarbons, alkynes are generally hydrophobic.
6. Stereochemistry, a sub-discipline of chemistry, involves the study of the relative spatial arrangement of atoms within molecules. An important branch of stereochemistry is the study of chiral molecules. Stereochemistry is also known as 3D chemistry because the prefix "stereo-" means "three-dimensionality".

Department of Zoology
Syllabus session – 2020-21
Class B.Sc. I year
Paper I

Title of the paper: Invertebrates & Cytology and Embryological Development

Subject Name – Zoology

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Course Objective – To know about invertebrates, classification, Parasites, Diseases and cell, structure cell division, Cell organelles, Embryology.

Learning Outcomes –

Upon completion of the course student should be able to –

1. Develop deeper understanding of what life is and how it functions at cellular level.
2. Understand the nature and basic concepts of cell biology, Reproductive and developmental biology.
3. Understand and identify patterns and stages during embryogenesis.
4. Well known about body plan of multicellular organism.
5. Students will be able to classify invertebrates they should be able to understand – Systematic classification of invertebrates, Phylogeny and evolution of invertebrates.
6. They will be known about structure, function and physiology of animals of different phylum.
7. Student will be able to acquire economical, ecological and medicinal importance of animal for the human welfare.
8. Understand – Control and importance of different parasites.

Course Specific Outcomes –

To give a through understanding in the fundamental principles of systematic in which the animals are how to classify according to there characters and what are theories which have to follow for classification is studied.

Department of Zoology
Syllabus session – 2020-21
Class B.Sc. I year

Paper II

Subject Name — Cytology and Embryological Development

Subject Nature – Compulsory

Course Specific Outcomes –

To give through understanding in the cell, Cell organelles. Students will able to get knowledge about embryonic development of chick and frog.

Practical –

1. Dissection of different systems of invertebrates.
2. Temporary slide preparation and studied through prepared slide.
3. Study of museum specimens (invertebrates).

Department of Botany
Syllabus session – 2020-21
Class B.Sc. I year

Paper I

Subject Name — Botany

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Course Outcome-

- Gives information regarding different plant products useful for human being.
- Microorganisms like bacteria, fungi contain various enzymes to decompose macromolecules therefore they can be good decomposers.
- Many bacteria and fungi are used in production of chemicals.
- To understand diseases which help to produce bio insecticides.
- To the production of bio fertilizers.

Department of Botany
Syllabus session – 2020-21
Class B.Sc. I year

Paper II

Subject Name — Diversity of huger plants

Subject Nature – Compulsory

Course Outcome-

- To help to study evolutionary innovation.
- To develop economically and industrially important plants in forest.
- Many plants produce herbal products.
- To conserve endanger plants.
- To produce various food products.

Department of Botany

Session – 2020-21

Class B.Sc. II year

Paper I

Title of the paper: Taxonomy and embryology of angiosperm

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 27	Theory maximum marks - 27
CCE maximum marks -07	CCE maximum marks -07
Practical Marks - 50	

- To identify the plants found in different climate.
- For identification and classification of plants.
- Plant taxonomy provides us detailed information regarding the vegetation.
- To preserve endanger plants.
- To get different spices, oils & other products.

Department of Botany

Session – 2020-21

Class B.Sc. II year

Paper II

Title of the paper: Plant ecology, Biodiversity & Phytogeography

- To develop pollution sensitive plants.
- To develop landscape by using biodiversity.
- To understand Aquatic and other ecosystem which can be develop commercially.
- To know the local flora and fauna.
- To manage the natural resource and their conservation.
- To understand adaptation in plants due to change in physical environment.

Department of Zoology

Session – 2020-21

Class B.Sc. II year

Paper I

Title of the papers: Vertebrates and evolution & Animal physiology and biochemistry

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Objective – To know about Chordata phylum, classification, comparative anatomy between classes of Chordata, fossils, evolutionary development, Physiology of digestion, respiration, excretion, endocrinology, nervous system, brain, hormones, carbohydrates, protein, fat metabolism.

Learning Outcomes –

After completing the syllabus students should be able to know about Higher vertebrates, connecting link between Chordata and non-chordates.

They will develop well understanding about chordates classification, structure and features. They understand about respiration, urogenital, digestion, excretion anatomy and physiology of chordates as a comparative study. They will get well knowledge of evolution, fossils and geological time scale. They will able to understand about carbohydrates, fat, protein metabolism, physiology of mammals,

endocrinology, muscles, hormones, and nervous system of mammals.

Title of the papers: Vertebrates and evolution

Course Specific Outcomes –

1. To make the students observed the diversity in chordates and their systematic position.
2. To make them aware of the economic importance of some classes, to impart knowledge about comparative anatomy and histology.

Title of the papers: Animal physiology and biochemistry

Course Specific Outcomes –

1. This course will provide students with the deep knowledge in physiology and biochemistry.
2. By the end of course student should be familiar with physiological system invertebrates.
3. Student will be able to know about endocrinology of human.

Practical -

1. Dissection of different systems of vertebrates such as cranial nerve of *Labio rohita* etc.
2. Study of evolutionary specimen and museum vertebrate's specimen.
3. Identification of slides and bones of vertebrates.
4. Biochemical test and haematological test.

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Course Objectives

Know the concept and application of class thermodynamic electrochemical and other physical phenomenon.

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 29	Theory maximum marks - 28	Theory maximum marks - 28
CCE maximum marks - 05	CCE maximum marks - 05	CCE maximum marks - 05
Practical maximum marks - 50		

Course Learning Outcomes

C01*

1. Thermodynamics is a branch of Physical chemistry that deals with heat, work and temperature and their relation to energy radiation and physical properties of matter.
2. Thermodynamics applies to a wide variety of topics in science and engineering especially physical chemistry biochemistry chemical engineering mechanical engineering and meteorology.

C02*

1. Phase rule is useful to metallurgists materials engineers – Development of new alloys for special application.
2. Fabrication of these alloys in to useful configuration.

3. design and control of heat treatment procedure of specific alloys these are many application of distribution law.
 - a. Solvent extraction.
 - b. Partition chromatography.
 - c. Desilverisation of lead.
 - d. Determination of dissociation and association.

CO3*

Explain electrolytic conduction and various types of conductance (molecular & equivalent). Describe Kohlrausch law and transport numbers. Explain the functions of various electrode reaction.

CO4*

Describe the functions various types of electrodes and also the knowledge of pH and buffer solution and Henderson Henderson equation.

CO5*

1. Surface chemistry plays an important role in industrial technologies for chemical and energy conversion health care material and environment protect.
2. Used in syrups paints tooth paste digestion of fats, pigment and dye.

Title of the paper: Inorganic chemistry course objective

To introduce student's d & f block elements coordination compound, oxidation reduction and acid-base concepts.

Couse Learning outcomes

CO1* The students will be able to explain characteristic properties of elements of first transition series & their compounds with stability geometry.

CO2* Students will able to describe properties of 2nd & 3rd transition series elements and their comparative study with 1st series elements.

CO3* The students will be able to explain fundamental concept of coordination chemistry. Structure and bonding in coordination compounds, oxidation reduction & principals involved in extraction of metals.

CO4* The students will get complete understanding of F block elements & their properties.

CO5* The students will be able to classify the compounds into acid or base, using different concepts will be familiar with reactions occurring in non aqueous solvents.

Title of the paper: Organic chemistry

To understand the structure of molecules through spectroscopy, reaction mechanism different functional groups, their proper structure activity relationship. This is of great help in the industry.

Course of Learning Outcomes

CO1*To enable the students to know about electromagnetic spectra, absorption and emission spectra, mainly UV and IR, UV and IR spectroscopy is a branch of organic chemistry which helps in the structure elucidation of organic molecules.

CO2*To help students to learn about the different types of alcohols and phenols on to know their preparation properties structure and uses.

CO3*To help students to know about the different types of aldehydes and ketones and to learn about their preparation properties, structure and uses.

CO4*To help students to know about the different type of carboxylic acids and to learn about their preparation, properties, structure and uses.

CO5*To help students to know about the different types of compounds of nitrogen like amino compounds, nitro compounds, azo compounds and to learn about their preparation, properties structure and uses.

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Programme Outcomes

- 1.** Students acquire knowledge about the concepts in organic, inorganic and physical chemistry.
- 2.** Students develop the skills on different methods of qualitative and quantitative analysis.
- 3.** Students be able to appreciate the applications of chemistry in day to day life and explore new areas and allied fields of science and technology.
- 4.** Clear understanding of the fundamental concepts in organic, inorganic, physical and analytical chemistry.
- 5.** Ability to perform scientific experiments skilfully by application of procedural knowledge.
- 6.** Idea about research in chemistry and knowledge of the significance of the scientific concepts learnt which find application in, industry, medicine and modern research.
- 7.** Capacity of working in research labs and related fields.

Programme specific outcomes: To impart knowledge on different topics of chemistry inorganic, organic, physical and analytical; of the level expected from a graduate in chemistry.

Department of Zoology
Session – 2020-21
Class B.Sc. III year

Title of the paper: Genetics & Ecology and Applied Zoology

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical - 50	

Course Objective – To know about Mendel's law, Operon Model, Linkage, Crossing over, protein synthesis, translocation, transcription, multiple alleles, blood group inheritance, sex determination, recombinant DNA Technology, chromosomal aberration, DNA finger printing and techniques used in different types of blotting and ecosystem, biogeochemical cycle, natural resources, different types of habitat, pollution, wild life conservation, culture method like prawn, prattle, frog and aquaculture lac, sericulture, apiculture and industry in India biological control of insect pests.

Learning Outcomes – After going through all syllabus student getting knowledge of genetics and ecosystem as well as culture and Indian industry. They will get well knowledge of different technology and methods used in DNA recombinant technology.

Now they are able to explain Mendel's law, operon model. Genetic disease, repair gene etc. Now they have gained very well knowledge about nature, pollution, ecosystem, habitat, culture wild life, natural resources and biogeochemical cycle.

Paper I - Genetics

Course Specific Outcomes –

- 1.** To emphasize the central roll that genetics in the life of all organisms.
- 2.** To develop critical thinking skills and to know about protein synthesis, blood group inheritance, sex determination, recombinant DNA technology and blotting technique.
- 3.** To explain the importance of genetics and biotechnology.

Department of Zoology

Session – 2020-21

Class B.Sc. III year

Title of the paper: - Ecology and Applied Zoology

Subject Nature – Compulsory

Course Specific Outcomes –

- 1.** To impart basic knowledge on animal different behavioural pattern and their role.
- 2.** To acquire knowledge about the evolutionary history of earth (Living and non-living).
- 3.** The study of distribution of animal on earth, its pattern, evolution and adaptation.
- 4.** To study global environmental problems.
- 5.** To appreciate strategies for animal conservation.
- 6.** To learn about national resources, pollution habitats and animal industries.

Practical –

1. Study of specimens (invertebrates) fresh water specimen, marine specimen, major carps.
2. To impart knowledge about water analysis.
3. To gain knowledge about ecology and instruments.
4. To impart knowledge regarding commercially available insect and their life cycle.
5. To understand different level of ecological diversity to impart knowledge regarding wild life, to know about genetics.
6. To study about life cycle of insects.

Department of Botany

Session – 2020-21

Class B.Sc. III year

Paper I

Title of the paper: Plant Physiology and biochemistry

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical - 50	

Course Outcomes-

- To reduce the transpiration in plants specially in draught affected areas.
- To know the biochemistry of different plants to understand the physiology.
- Industrial production of enzyme and other components with special reference to human health and disease control.
- Production of natural complex macromolecules.

Department of Botany

Session – 2020-21

Class B.Sc. III year

Paper II

Title of the paper: Cell biology, Genetics & biotechnology

Subject Nature – Compulsory

Course Outcomes-

- To produce new hybrid by using breeding techniques.
- In seed selection – To develop disease resistant seeds.
- For large scale production of seed.
- To develop draught resistant seeds.
- To get the knowledge of gene therapy.
- To develop recombinants used in food processing industry.

Department of Chemistry

Session – 2020-21

Class B.Sc. III year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 27	Theory maximum marks - 27	Theory maximum marks - 26
CCE maximum marks - 07	CCE maximum marks - 07	CCE maximum marks -06
Practical maximum marks - 50		

Paper I

Course Outcomes-

-- **Elementary quantum mechanics**

Quantum mechanics is an important tool to understand at the theoretical level the electronic structure of chemical compounds and the mechanism, thermodynamics, and kinetics of chemical reactions. quantum mechanics, science dealing with the behaviour of matter and light on the atomic and subatomic scale. It attempts to describe and account for the properties of molecules and atoms and their constituents—electrons, protons, neutrons, and other more esoteric particles such as quarks and gluons.

--**spectroscopy**

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments

as well as accurately record and analyze the results of such experiments.

Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

--**Rotational spectrum and vibration spectrum**

The key difference between rotational and vibrational spectroscopy is that rotational spectroscopy is used to measure the energy of the transitions that take place between quantized rotational states of molecules in the gas phase, whereas vibrational spectroscopy is used in measuring the interaction of IR radiation ...

-- **raman spectrum**

Raman spectroscopy can differentiate chemical structures, even if they contain the same atoms in different arrangements. Analyse your sample multiple times without damage. If you can use an optical microscope to focus onto the analysis region, you can use a Raman microscope to collect its Raman spectrum.

--**Electronic spectrum**

Students will identify and compare characteristics of the electromagnetic spectrum including speed, wavelength and frequency. Students will identify common uses and applications of electromagnetic waves. Students will use algebraic equations to calculate and describe the wavelength, frequency and speed of EM radiation.

--**UV spectrum**

Will be able to interpret UV-Visible spectroscopy, 1.1 Explain basic principles of UV-Visible spectroscopy, 1.2. Explain relevant terms of UV-Visible spectroscopy, 1.3. Explain working principle, taking spectra and outline of UV spectroscopy device, 2. Will be able to interpret IR spectroscopy,

--**photochemistry**

Formulate the macroscopic and quantum laws of the absorption of light by molecules and solids. Describe the various deactivation processes of molecular excited states. Characterize the kinetics of deactivation processes and their role in the photochemical reactivity.

--**physical property and molecular structure**

Students will compare, contrast and predict physical and chemical properties based on atomic and molecular structure. Students will apply these principles to the chemistry of living systems and demonstrate the ability to solve quantitative, interdisciplinary, and real-world problems.

Students will observe safe practices in the laboratory and will know how to respond in an emergency. Students will learn to gather hazardous materials information and will recognize and respond properly to potential hazards of handling chemicals and chemical waste.

Department of Chemistry

Session – 2020-21

Class B.Sc. III year

Title of the paper: Inorganic Chemistry

Nature of the paper: Compulsory

Paper II

--Hard and soft acids and bases (HSAB)

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

--silicones and phosphazenes

Understand the electrophilic and nucleophilic reactions. Understand the addition, substitution, replacement and rearrangement reactions. Knowledge of important reagents used in chemical industries. Understand the reaction mechanism of various name reactions.

--metal ligand bonding in transition metal complexes

The transition elements and main group elements can form coordination compounds, or complexes, in which a central metal atom or ion is bonded to one or more ligands by coordinate covalent bonds. Ligands with more than one donor atom are called polydentate ligands and form chelates.

--thermodynamics and kinetic aspects of metal complexes.

thermodynamic stability of complexes is the measure of tendency of a metal ion to selectively form a specific metal complex and is directly related to the metal-ligand bond energies. The thermodynamic stability of complexes is represented by formation constant.

--magnetic Properties of transition metal complex.

Due to the presence of unpaired electrons in the $(n-1)d$ -orbitals, most of the transition metals ions and their compounds are paramagnetic i.e. they are attracted by the magnetic field. 2. As the number of unpaired electrons increases from 1 to 5, the magnetic moment and hence paramagnetic character also increase.

--**electronic spectra of transition metal complex.**

The spectra of transition metal complexes is not as simple as it appears from just the splitting of d - orbitals with electrons get promoted from the lower energy orbital set to a higher energy orbital set.

--**bio organic chemistry**

You'll learn about atoms and orbitals; hybridization and bonding. You'll learn about the basic molecules, including how to name them. This will allow you to carry out reactions on exams when given a name instead of a structure.

Department of Chemistry

Session – 2020-21

Class B.Sc. III year

Title of the paper: Organic Chemistry

Nature of the paper: Compulsory

Paper III

--nuclear magnetic resonance spectroscopy.

relate NMR parameters such as chemical shift, scalar coupling constants, and relaxation time constants to molecular structure. the ability to investigate and determine the structure of typical organic chemical compounds (molecular weight up to ca.

--organo- metallic compounds.

knows the most important classes of ligands found in organometallic compounds. has broad knowledge of nomenclature, coordination modes, geometries, and fundamental reaction types. has knowledge of the chemical bonds and the theories that explain the electronic properties within organometallic ...

--organo sulphur compounds.

Organosulfur compounds are organic molecules that contain sulfur and are associated with the pungent odors characteristic of allium vegetables such as garlic and onions. They are also abundant in cruciferous vegetables such as broccoli and cabbage.

--carbohydrate

Describe the different types of simple and complex carbohydrates. Describe the process of carbohydrate digestion and absorption. Describe the functions of carbohydrates in the body. Describe the body's carbohydrate needs and how personal choices can lead to health benefits or consequences.

--fat, oil and detergents.

Fats and oils that are in contact with moist air at room temperature eventually undergo oxidation and hydrolysis reactions that cause them to turn rancid, acquiring a characteristic disagreeable odor. One cause of the odor is the release of volatile fatty acids by hydrolysis of the ester bonds.

--Amino acid, peptide, protein and nucleic acid.

understand that the human body, and everything else, is made up of atoms and that there are about 26 different sorts of atom in the human body, combined into numerous different sorts of molecules understand that amino acids contain carbon, nitrogen, oxygen and hydrogen atoms, some contain an atom of sulphur and that there are about 20 different amino acids, with different side-chains (R groups) understand that amino acids are linked via peptide bonds to make polypeptides and proteins.

--synthetic dyes

In this regard, a variety of dyes, including anthraquinones, aryl amines, azo dyes, BODIPY, carbazoles, cyanines, fluoresceins, oxazines, phenothiazines, rhodamines, squaraines, thiophene dyes, etc., were collected and discussed.

--Pericyclic reactions

Since pericyclic reactions proceed by a cyclic reorganization of bonding electron pairs, it is necessary to evaluate changes in the associated molecular orbitals that take place in going from reactants to products.

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year

Title of the paper: Physical Chemistry

Nature of the paper: :Compulsory

Examination scheme :

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 29	Theory maximum marks - 28	Theory maximum marks - 28
CCE maximum marks -05	CCE maximum marks -05	CCE maximum marks -05
Practical maximum marks - 50		

Course Objective-

1. Physical Chemistry is a branch of chemistry that studies the physical and material properties of a chemical system or chemical process.
2. Chemistry is a big part of your everyday life. You find chemistry in food, the air, cleaning chemicals, your emotions and literally every object you can see or touch.
3. Inorganic compounds are used as catalysts, pigments, coatings, surfactants, medicines, fuels and more oxygen is both organic and inorganic compound but the oxidation itself has inorganic chemistry mechanism.
4. The use of organic compounds has simplified human life. The significance of organic compounds in daily life and industry can be stated in the following way. Food vitamins, proteins, sugar, wheat, lipids and other organic compounds.

Learning Outcomes -

1. Colloids are used for electrical precipitation of smoke, purification of drinking water, medicine, tanning, cleansing action of soap and detergent, photographic plates and films, Rubber Industry, in disinfectant, metallurgy, colloidal graphite. artificial rain etc.
2. Chemical equilibrium is a state in the course of a chemical reaction where the concentrations of both products and reactants reach the limit which prevents further deviation.
3. When you understand a mathematical concept you have essentially reached an upper tier in math that allows you to think and process abstractly.
4. Ideal gases are used to determine ideal efficiencies of engine and in various thermal equipments to determine various output parameters theoretically
5. The gaseous state is the easiest to study. A change in temperature results in evident changes in other quantities like volume and pressure.
6. Seven - segment displays are commonly used in digital clocks, clock radios, times wrist watches and calculators.

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year
Paper second

Title of the paper: Inorganic chemistry

Nature of the paper: Compulsory

1. The atomic structure of an element refers to the constitution of its nucleus and the arrangement of the electrons around it. Primarily, the atomic structure of matter is made up of protons, electrons and neutrons.
2. The periodic table is useful for modern students because it helps predict the types of chemical reactions that a particular element is likely to participate in. Rather than memorizing facts and figures for each element, students need only glance at the table to learn much about the reactivity of an element, whether it is likely to conduct electricity, whether it is hard or soft, and many other characteristics.
3. The strength of the attractive forces depends on the charge and size of the ions that compose the lattice and determines many of the physical properties of the crystal.
4. Inert atmospheres, which are commonly used for arc welding, specimen protection, and chemical reaction prevention, are created using noble gases. Neon lights and krypton headlights, as well as lasers, contain the elements. Superconducting magnets are cooled with helium, which is also used in balloons and deep-sea diving air tanks.
5. Silicates are the most abundant class of minerals on Earth. Sand and quartz crystals are silicates, and silicon is its central part. Because of their unique properties, silicates have many cool technological uses.

Department of Chemistry
Syllabus session – 2020-21
Class B.Sc. I year
Paper Third

Title of the paper: Organic chemistry

Nature of the paper: Compulsory

1. To understand structure and bonding, students need to know about the orbital model of the atom, plus covalent, ionic and metallic bonding:
2. The purpose of the IUPAC system of nomenclature is to establish an international standard of naming compounds to facilitate communication. The goal of the system is to give each structure a unique and unambiguous name, and to correlate each name with a unique and unambiguous structure.
3. Cyclo-alkanes are also called cycloparaffins. They are Alicyclic Compounds i.e. they are both aliphatic and cyclic compounds, and their properties are almost similar to alkanes.
4. The alkenes are also too useful in the chemical industry for the manufacture of plastics and many other chemicals to be used as fuels.
5. In organic chemistry, an alkyne is an unsaturated hydrocarbon containing at least one carbon-carbon triple bond. Like other hydrocarbons, alkynes are generally hydrophobic.
6. Stereochemistry, a sub-discipline of chemistry, involves the study of the relative spatial arrangement of atoms within molecules. An important branch of stereochemistry is the study of chiral molecules . Stereochemistry is also known as 3D chemistry because the prefix "stereo-" means "three-dimensionality."

Department of Zoology
Syllabus session – 2020-21
Class B.Sc. I year
Paper I

Title of the paper: Invertebrates & Cytology and Embryological Development

Subject Name – Zoology

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Course Objective

To know about invertebrates, classification, Parasites, Diseases and cell, structure cell division, Cell organelles, Embryology.

Learning Outcomes

Upon completion of the course student should be able to –

1. Develop deeper understanding of what life is and how it functions at cellular level.
2. Understand the nature and basic concepts of cell biology, Reproductive and developmental biology.
3. Understand and identify patterns and stages during embryogenesis.
4. Well known about body plan of multicellular organism.
5. Students will able to classify invertebrates they should be able to understand – Systematic classification of invertebrates, Phylogeny and evolution of invertebrates.
6. They will be known about structure, function and physiology of animals of different phylum.
7. Student will be able to acquire economical, ecological and medicinal importance of animal for the human welfare.
8. Understand – Control and importance of different parasites.

Course Specific Outcomes

To give a through understanding in the fundamental principles of systematic in which the animals are how to classify according to there characters and what are theories which have to follow for classification is studied.

Department of Zoology
Syllabus session – 2020-21
Class B.Sc. I year
Paper II

**Subject Name – Cytology and Embryological
Development**
Subject Nature – Compulsory

Course Specific Outcomes –

To give through understanding in the cell, Cell organelles. Students will able to get knowledge about embryonic development of chick and frog.

Practical –

1. Dissection of different systems of invertebrates.
2. Temporary slide preparation and studied through prepared slide.
3. Study of museum specimens (invertebrates).

Department of Biotechnology
Syllabus session – 2020-21
Class B.Sc. I year
Paper I

Title of the paper: Cell Structure & Biology

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks – 40	Theory maximum marks – 40
CCE maximum marks -7.5	CCE maximum marks -7.5
Practical Marks - 50	

Learning Outcomes –

At the end of the course will give the students a basic knowledge –

This provides detailed understanding of various processes including cell division signal transduction pathway and regulation respectively.

Reference Books –

1. Industrial Microbiology by A.H. Patel
2. Biotechnology & Genomics P.K. Gupta
3. Text Book of Biotechnology R.C. Dubey

Department of Biotechnology
Syllabus session – 2020-21
Class B.Sc. I year
Paper II

Title of the paper: Microbiology
Nature of the paper: Compulsory

This course provides the uses of microbial sources for large scale production of commercially important products.

Reference Books –

1. A text book of Bioinformatics by Sharma & Munjal & Shankar
2. Biostatics by B. Prasad
3. Principle of Biochemistry, Lininger
4. Biophysics: Mohan P. Arora

Department of Biotechnology

Session – 2020-21

Class B.Sc. II year

Paper I

Title of the paper: Biochemistry and Biophysics

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks – 40	Theory maximum marks – 40
CCE maximum marks -7.5	CCE maximum marks -7.5
Practical Marks - 50	

Learning Outcomes –

At the end of the course will give the student a basic knowledge

To provide insights of the building blocks of living cells that ultimately from the organism.

Department of Biotechnology

Session – 2020-21

Class B.Sc. II year

Paper II

Title of the paper: Bio- instrumentation, Biostatistics & Bio-informatics

Nature of the paper: Compulsory

Learning Outcomes –

To meet the challenges of advance biological research various computer based tools and basic of biostatistics are required and this course address all those criteria.

Department of Zoology

Session – 2020-21

Class B.Sc. II year

Paper I

Title of the papers: Vertebrates and evolution & Animal physiology and biochemistry

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Objective – To know about Chordata phylum, classification, comparative anatomy between classes of Chordata, fossils, evolutionary development, Physiology of digestion, respiration, excretion, endocrinology, nervous system, brain, hormones, carbohydrates, protein, fat metabolism.

Learning Outcomes –

After completing the syllabus students should be able to know about –

Higher vertebrates, connecting link between Chordata and non-chordates.

They will develop well understanding about chordates classification, structure and features. They understand about respiration, urogenital, digestion, excretion anatomy and physiology of chordates

as a comparative study. They will get well knowledge of evolution, fossils and geological time scale. They will able to understand about carbohydrates, fat, protein metabolism, physiology of mammals, endocrinology, muscles, hormones, and nervous system of mammals.

Title of the papers: Vertebrates and evolution

Course Specific Outcomes –

1. To make the students observed the diversity in chordates and their systematic position.
2. To make them aware of the economic importance of some classes, to impart knowledge about comparative anatomy and histology.

Title of the papers: Animal physiology and biochemistry

Course Specific Outcomes –

1. This course will provide students with the deep knowledge in physiology and biochemistry.
2. By the end of course student should be familiar with physiological system invertebrates.
3. Student will be able to know about endocrinology of human.

Practical -

1. Dissection of different systems of vertebrates such as cranial nerve of *Labio rohita* etc.
2. Study of evolutionary specimen and museum vertebrate's specimen.
3. Identification of slides and bones of vertebrates.
4. Biochemical test and haematological test.

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Course Objectives

Know the concept and application of class thermodynamic electrochemical and other physical phenomenon.

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 29	Theory maximum marks - 28	Theory maximum marks - 28
CCE maximum marks - 05	CCE maximum marks - 05	CCE maximum marks - 05
Practical maximum marks - 50		

Course Learning Outcomes

C01*

1. Thermodynamics is a branch of Physical chemistry that deals with heat, work and temperature and their relation to energy radiation and physical properties of matter.
2. Thermodynamics applies to a wide variety of topics in science and engineering especially physical chemistry biochemistry chemical engineering mechanical engineering and meteorology.

C02*

1. Phase rule is useful to metallurgist's materials engineers – Development of new alloys for special application.

2. Fabrication of these alloys in to useful configuration.
3. design and control of heat treatment procedure of specific alloys these are many application of distribution law.
 - a. Solvent extraction.
 - b. Partition chromatography.
 - c. Desilverisation of lead.
 - d. Determination of dissociation and association.

CO3*

Explain electrolytic conduction and various types of conductance (molecular & equivalent). Describe Kohlrausch law and transport numbers. Explain the functions of various electrode reaction.

CO4*

Describe the functions various types of electrodes and also the knowledge of PH and buffer solution and Henderson Henderson equation.

CO5*

1. Surface chemistry plays an important role in industrial technologies for chemical and energy conversion health care material and environment protect.
2. Used in syrups paints tooth paste digestion of fats, pigment and dye.

Title of the paper: Inorganic chemistry course objective

To introduce student's d & f block elements coordination compound, oxidation reduction and acid-base concepts.

Couse Learning outcomes

CO1* The students will be able to explain characteristic properties of elements of first transition series & their compounds with stability geometry.

CO2* Students will able to describe properties of 2nd & 3rd transition series elements and their comparative study with 1st series elements.

CO3* The students will be able to explain fundamental concept of coordination chemistry. Structure and bonding in coordination compounds, oxidation reduction & principals involved in extraction of metals.

CO4* The students will get complete understanding of F block elements & their properties.

CO5* The students will be able to classify the compounds into acid or base, using different concepts will be familiar with reactions occurring in non aqueous solvents.

Title of the paper: Organic chemistry

To understand the structure of molecules through spectroscopy, reaction mechanism different functional groups, their proper structure activity relationship. This is of great help in the industry.

Course of Learning Outcomes

CO1*To enable the students to know about electromagnetic spectra, absorption and emission spectra, mainly UV and IR, UV and IR spectroscopy is a branch of organic chemistry which helps in the structure elucidation of organic molecules.

CO2*To help students to learn about the different types of alcohols and phenols on to know their preparation properties structure and uses.

CO3*To help students to know about the different types of aldehydes and ketones and to learn about their preparation properties, structure and uses.

CO4*To help students to know about the different type of carboxylic acids and to learn about their preparation, properties, structure and uses.

CO5*To help students to know about the different types of compounds of nitrogen like amino compounds, nitro compounds, azo compounds and to learn about their preparation, properties structure and uses.

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Programme Outcomes

- 1.** Students acquire knowledge about the concepts in organic, inorganic and physical chemistry.
- 2.** Students develop the skills on different methods of qualitative and quantitative analysis.
- 3.** Students be able to appreciate the applications of chemistry in day to day life and explore new areas and allied fields of science and technology.
- 4.** Clear understanding of the fundamental concepts in organic, inorganic, physical and analytical chemistry.
- 5.** Ability to perform scientific experiments skilfully by application of procedural knowledge.
- 6.** Idea about research in chemistry and knowledge of the significance of the scientific concepts learnt which find application in, industry, medicine and modern research.
- 7.** Capacity of working in research labs and related fields.

Programme specific outcomes: To impart knowledge on different topics of chemistry inorganic, organic, physical and analytical; of the level expected from a graduate in chemistry.

Department of Chemistry

Session – 2020-21

Class B.Sc. III year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 27	Theory maximum marks - 27	Theory maximum marks - 26
CCE maximum marks - 07	CCE maximum marks - 07	CCE maximum marks -06
Practical maximum marks - 50		

Paper I

Course Outcomes-

-- Elementary quantum mechanics

Quantum mechanics is an important tool to understand at the theoretical level the electronic structure of chemical compounds and the mechanism, thermodynamics, and kinetics of chemical reactions. quantum mechanics, science dealing with the behaviour of matter and light on the atomic and subatomic scale. It attempts to describe and account for the properties of molecules and atoms and their constituents—electrons, protons, neutrons, and other more esoteric particles such as quarks and gluons.

--spectroscopy

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

--**Rotational spectrum and vibration spectrum**

The key difference between rotational and vibrational spectroscopy is that rotational spectroscopy is used to measure the energy of the transitions that take place between quantized rotational states of molecules in the gas phase, whereas vibrational spectroscopy is used in measuring the interaction of IR radiation ...

--**raman spectrum**

Raman spectroscopy can differentiate chemical structures, even if they contain the same atoms in different arrangements. Analyse your sample multiple times without damage. If you can use an optical microscope to focus onto the analysis region, you can use a Raman microscope to collect its Raman spectrum.

--**Electronic spectrum**

Students will identify and compare characteristics of the electromagnetic spectrum including speed, wavelength and frequency. Students will identify common uses and applications of electromagnetic waves. Students will use algebraic equations to calculate and describe the wavelength, frequency and speed of EM radiation.

--**UV spectrum**

Will be able to interpret UV-Visible spectroscopy, 1.1 Explain basic principles of UV-Visible spectroscopy, 1.2. Explain relevant terms of UV-Visible spectroscopy, 1.3. Explain working principle, taking spectra and outline of UV spectroscopy device, 2. Will be able to interpret IR spectroscopy,

--**photochemistry**

Formulate the macroscopic and quantum laws of the absorption of light by molecules and solids. Describe the various deactivation processes of molecular excited states. Characterize the kinetics of deactivation processes and their role in the photochemical reactivity.

--**physical property and molecular structure**

Students will compare, contrast and predict physical and chemical properties based on atomic and molecular structure. Students will apply these principles to the chemistry of living systems and demonstrate the ability to solve quantitative, interdisciplinary, and real-world problems.

Students will observe safe practices in the laboratory and will know how to respond in an emergency. Students will learn to gather hazardous materials information and will recognize and respond properly to potential hazards of handling chemicals and chemical waste.

Department of Chemistry

Session – 2020-21

B.Sc. III year

Title of the paper: Inorganic Chemistry

Nature of the paper: Compulsory

Paper II

--Hard and soft acids and bases (HSAB)

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

--silicones and phosphazenes

Understand the electrophilic and nucleophilic reactions. Understand the addition, substitution, replacement and rearrangement reactions. Knowledge of important reagents used in chemical industries. Understand the reaction mechanism of various name reactions.

--metal ligand bonding in transition metal complexes

The transition elements and main group elements can form coordination compounds, or complexes, in which a central metal atom or ion is bonded to one or more ligands by coordinate covalent bonds. Ligands with more than one donor atom are called polydentate ligands and form chelates.

--thermodynamics and kinetic aspects of metal complexes.

thermodynamic stability of complexes is the measure of tendency of a metal ion to selectively form a specific metal complex and is directly related to the metal-ligand bond energies. The thermodynamic stability of complexes is represented by formation constant.

--magnetic Properties of transition metal complex.

Due to the presence of unpaired electrons in the $(n-1)d$ -orbitals, most of the transition metals ions and their compounds are paramagnetic i.e. they are attracted by the magnetic field. 2. As the number of unpaired electrons increases from 1 to 5, the magnetic moment and hence paramagnetic character also increase.

--**electronic spectra of transition metal complex.**

The spectra of transition metal complexes is not as simple as it appears from just the splitting of d - orbitals with electrons get promoted from the lower energy orbital set to a higher energy orbital set.

--**bio organic chemistry**

You'll learn about atoms and orbitals; hybridization and bonding. You'll learn about the basic molecules, including how to name them. This will allow you to carry out reactions on exams when given a name instead of a structure.

Department of Chemistry
Syllabus session – 2020-21
B.Sc. III year

Title of the paper: Organic Chemistry

Nature of the paper: Compulsory

Paper III

--nuclear magnetic resonance spectroscopy.

relate NMR parameters such as chemical shift, scalar coupling constants, and relaxation time constants to molecular structure. the ability to investigate and determine the structure of typical organic chemical compounds (molecular weight up to ca.

--organo- metallic compounds.

knows the most important classes of ligands found in organometallic compounds. has broad knowledge of nomenclature, coordination modes, geometries, and fundamental reaction types. has knowledge of the chemical bonds and the theories that explain the electronic properties within organometallic ...

--organo sulphur compounds.

Organosulfur compounds are organic molecules that contain sulfur and are associated with the pungent odors characteristic of allium vegetables such as garlic and onions. They are also abundant in cruciferous vegetables such as broccoli and cabbage.

--carbohydrate

Describe the different types of simple and complex carbohydrates. Describe the process of carbohydrate digestion and absorption. Describe the functions of carbohydrates in the body. Describe the body's carbohydrate needs and how personal choices can lead to health benefits or consequences.

--fat, oil and detergents.

Fats and oils that are in contact with moist air at room temperature eventually undergo oxidation and hydrolysis reactions that cause them to turn rancid, acquiring a characteristic disagreeable odor. One cause of the odor is the release of volatile fatty acids by hydrolysis of the ester bonds.

--Amino acid, peptide, protein and nucleic acid.

understand that the human body, and everything else, is made up of atoms and that there are about 26 different sorts of atom in the human body, combined into numerous different sorts of molecules understand that amino acids contain carbon, nitrogen, oxygen and hydrogen atoms, some contain an atom of sulphur and that there are about 20 different amino acids, with different side-chains (R groups) understand that amino acids are linked via peptide bonds to make polypeptides and proteins.

--synthetic dyes

In this regard, a variety of dyes, including anthraquinones, aryl amines, azo dyes, BODIPY, carbazoles, cyanines, fluoresceins, oxazines, phenothiazines, rhodamines, squaraines, thiophene dyes, etc., were collected and discussed.

--Pericyclic reactions

Since pericyclic reactions proceed by a cyclic reorganization of bonding electron pairs, it is necessary to evaluate changes in the associated molecular orbitals that take place in going from reactants to products.

Department of Zoology

Session – 2020-21

B.Sc. III year

Title of the paper: Genetics & Ecology and Applied Zoology

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical - 50	

Course Objective – To know about Mendel's law, Operon Model, Linkage, Crossing over, protein synthesis, translocation, transcription, multiple alleles, blood group inheritance, sex determination, recombinant DNA Technology, chromosomal aberration, DNA finger printing and techniques used in different types of blotting and ecosystem, biogeochemical cycle, natural resources, different types of habitat, pollution, wild life conservation, culture method like prawn, prattle, frog and aquaculture lac, sericulture, apiculture and industry in India biological control of insect pests.

Learning Outcomes – After going through all syllabus student getting knowledge of genetics and ecosystem as well as culture and Indian industry. They will get well knowledge of different technology and methods used in DNA recombinant technology.

Now they are able to explain Mendel's law, operon model. Genetic disease, repair gene etc. Now they have gained very well knowledge about nature, pollution, ecosystem, habitat, culture wild life, natural resources and biogeochemical cycle.

Paper I - Genetics

Course Specific Outcomes –

- 1.** To emphasize the central roll that genetics in the life of all organisms.
- 2.** To develop critical thinking skills and to know about protein synthesis, blood group inheritance, sex determination, recombinant DNA technology and blotting technique.
- 3.** To explain the importance of genetics and biotechnology.

Department of Zoology

Session – 2020-21

B.Sc. III year

Title of the paper: - Ecology and Applied Zoology

Subject Nature – Compulsory

Course Specific Outcomes –

1. To impart basic knowledge on animal different behavioural pattern and their role.
2. To acquire knowledge about the evolutionary history of earth (Living and non-living).
3. The study of distribution of animal on earth, its pattern, evolution and adaptation.
4. To study global environmental problems.
5. To appreciate strategies for animal conservation.
6. To learn about national resources, pollution habitats and animal industries.

Practical –

1. Study of specimens (invertebrates) fresh water specimen, marine specimen, major carps.
2. To impart knowledge about water analysis.
3. To gain knowledge about ecology and instruments.
4. To impart knowledge regarding commercially available insect and their life cycle.
5. To understand different level of ecological diversity to impart knowledge regarding wild life, to know about genetics.
6. To study about life cycle of insects.

Department of Biotechnology

Session – 2020-21

B.Sc. III year

Paper I

Title of the paper: Molecular Biology and Genetic Engineering –

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks – 40	Theory maximum marks – 40
CCE maximum marks -7.5	CCE maximum marks -7.5
Practical Marks - 50	

Learning Outcomes –

At the end of the course will give the students a basic knowledge.

This course provides detailed understanding of the DNA replication, Transcriptions, translation and protein folding and sorting as well as their regulation, respectively.

Students will gain and apply knowledge of Biotech comprised of science and engineering components to solve problem related to field of Biotechnology.

Department of Biotechnology

Session – 2020-21

B.Sc. III year

Paper II

Title of the paper– Applied Biotechnology

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks – 40	Theory maximum marks – 40
CCE maximum marks -7.5	CCE maximum marks -7.5
Practical Marks - 50	

This comes makes understanding of the tool and technique of genetic engineering modification based agronomic development.

This is to provide the mechanism of immunity and the role of various immune cells in normal maintenance of immunity and alteration that cause different disorders.

Reference Books –

1. Cell and molecular Biology : P.K. Gupta
2. Cell and Molecular Biology : S.C. Rastogi
3. Text book of Microbiology : R.C. Dubey
4. Applied Microbiology : P.D. Sharma
5. Microbial Fundamental & Application -S.S. Purohit

Department of Physics

Syllabus session – 2020-21

Class B.Sc. II year

Paper – I

Subject Nature – Compulsory

Title of the Paper - OPTICS

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks 40	Theory maximum marks 40
CCE maximum marks 10	CCE maximum marks 10
Practical maximum marks 50	

Course Objective: To enforce the students with the strength of physics fundamentals and scope of optics, electrostatics and magneto statics. To provide the foundation for 360-degree dimensional platform of technology and science so that is would open vistas for profession, research and career.

Learning Outcome:

At the end of the course students should be able to:

The wave optics part of the course will give the student a basic knowledge within interference, polarization, diffraction, and the basics of coherent and non-coherent light sources.

The student should be able to understand the concept of electric field lines and use their understanding to predict the electric field lines about a point charge or a configuration of point charges.

Course Contents :

(PAPER - I)

UNIT – I (GEOMETRICAL OPTICS)

The course will enable the students to develop ideas about the behavior of optics.

UNIT- II (INTERFERENCE OF LIGHT)

The course gives details about the basic concept of waves interference and their behavior to the students Through this student can compile Newton ring experiments and other experiments with details.

UNIT- III (DIFFRACTION)

This course is useful in explaining to the students the basic concept of diffraction of light and its types in detail. Through this, students can study the spectrum of grating and prisms and find the resolving power of microscope telescope and grating.

UNIT- IV (POLARISATION)

Course introduces students to polarized and non-polarized light Through this student can easily understand Brewster Law With the help of student can easily understand quarter wave plate and half wave plate and babinet's compensator.

UNIT- V (LASERS AND PHOTO SENSORS)

The course provides students about the history and characteristics of lasers and its uses in daily life. Syllabus gives knowledge of photo sensors to students.

(PAPER - II)
UNIT – I (ELECTROSTATICS)

Syllabus provide the students about the basic concepts of Static Electricity and give the knowledge of coloumb's law gauss law and its applications Students study various types of capacitors from the course.

UNIT – II (MAGNETOSTATICS)

Syllabus provide the students Force on a moving charge in a magnetic field, Lorentz force and derivation of Lorentz formulas with the help of this student's study of biot savart's law and its application.

UNIT – III (CURRENT ELECTRICITY AND BIOELECTRICITY)

Syllabus provide the students basic concept of current electricity and analysis of multi loop circuit. Observing and studying electricity in biological bodies.

UNIT – IV (MOTION OF CHARGED PARTICLES IN ELECTRIC AND MAGNETIC FIELD)

From the course students learn electron gun, CRO and sensitivity of CRO and Thomson's methods for the determination of specific charges of electron.

UNIT – V (ELECTRODYNAMICS)

From the syllabus students study Magnetic Flux, Faraday's Law and Maxwell's Law, which are used to solve the problem related to the subject.

B.Sc. II (Computer Science)

Session-2020-21

Subject Name-Object Oriented Programming Using C++

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective

After completion of this course, student will be

- Able to Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.
- Able to make use of objects and classes for developing programs.
- Able to use various object oriented concepts to solve different problems.

Learning Outcomes

On completion of the course the students should be able to:

- Describe the meaning of the object-oriented paradigm, and create class hierarchies using the object-oriented design process
- Design and implement C++ programs for complex problems, making good use of the features of the language such as classes, inheritance and templates

Examination Scheme-

1.The Faculty member will award internal marks out of 10 based on 2 assessments of 5 marks. The end of examination will be worth 50 marks having practical Problem.

2.Each theory question paper will contain 5 objective type question of 1 marks,5 short types Question of 3 marks and 5 long type question of 6 marks.

Unit-No	Course Content	CLO (course Learning outcomes)
Unit-1	Introduction of C++ Programming Paradigm ,key concept of object oriented programming ,advantage of OOP's , Input and Output in C++ , Pre-defined stream ,Unformatted console I/O Operation , formatted console I/O Operation.	<ul style="list-style-type: none">• After completion of this Unit, student will be able to use various object oriented concepts to solve different problems.• Identify importance of object oriented programming and difference between structured oriented and object oriented programming features.• Understand the difference between top down and bottom up approach.
Unit-2	C ++ declarations : Parts of C++ Program, types of tokens , Keywords identifies ,data types ,constants operators, precedence of operators ,referencing and dereferencing operators ,	<ul style="list-style-type: none">• After completion of this Unit, student will be able to design, implement programs using the fundamental elements of C++<ul style="list-style-type: none">◦ Describe the fundamental components of a C++ program (e.g.,. source files,

	<p>Scope access operator , control structures : decision making statements, looping statements</p>	<p>header files, main() function, functions, and libraries)</p> <ul style="list-style-type: none"> ○ Explain and apply fundamental syntax rules for identifiers, declarations, expressions, statements, ○ Demonstrate an understanding of the overall syntax and semantics of C++ programs by writing small programs from specifications given in class ○ Modify and extend short programs that use standard conditional and iterative control structures ○ Choose appropriate conditional and iterative constructs for a given programming task.
Unit-3	<p>Function: main(), parts of function ,passing arguments : value address , reference ,inline functions , function overloading : principles , precautions , library functions.</p>	<ul style="list-style-type: none"> ● After completion of this Unit, student will be able to make use of objects and classes for developing programs.

	<p>Classes and objects: declaring classes and objects , accessing class members , Keywords :Public , Private , Protected. defining member functions: member function inside the class , member function outside the class , Static member variables and functions, friend functions , friend classes ,overloading member functions.</p>	
Unit-4	<p>Constructor and Destructor: characteristics ,applications ,Constructors with arguments ,overloading Constructors , types of Constructor, Operator overloading: overloading unary operator ,Binary operator Inheritance-access Specifiers : Public Inheritance ,private Inheritance , Protected data with private Inheritance ,Types of Inheritance : single Inheritance, Multiple Inheritance ,Multilevel Inheritance , hybrid Inheritance ,multipath Inheritance ,Virtual base class</p>	<ul style="list-style-type: none"> • After completion of this Unit, student will be able to reuse code to another class. • Able to same operator and same function in different task. • Able to implement constructors and class member function
Unit-5	<p>Pointer declaration ,Pointer to class & Object, Array:</p>	<ul style="list-style-type: none"> • After completion of this Unit, student will be able to apply

declaration & initialization ,array of classes, Polymorphism: static(Early) Binding ,Dynamic (Late) Binding, Virtual function ,Pure virtual function	Virtual and pure virtual & complex Programming situation <ul style="list-style-type: none"> • Able to use pointer for dynamic memory allocation.
----------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------

Text Book-

1. Object Oriented Programming with ANSI & Turbo C++ Ashok N. Kamthane
2. E. Balagurusamy: Object Oriented Programming in c++

References Book-

1. Herbert Schildt: C++ the complete Reference-TMH Publication
2. Robert Lafore: Object Oriented Programming in c++

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – I

Title of the paper – Abstract Algebra

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks -	Theory maximum marks -	Theory maximum marks -
CCE maximum marks -	CCE maximum marks -	CCE maximum marks -

Course Objective –

To enforce the students with the basic properties of groups. To provide the basic knowledge of Homomorphism and isomorphism of groups define rings and its basic properties, field and quotient field.

Learning Outcomes –

At the end of the course students should be able to

- Study groups, types of groups they will learn about Homomorphism and isomorphism.
- Enhance their knowledge about conjugacy Relation, Normalizer. They will study of Cauchy's theorem.
- They will know about Ring, types of rings and its properties. They are also known about integral domain and field.

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – II

Title of the paper – Advanced Calculus

Subject Nature – Compulsory

Course Objective –

To enhance the knowledge of students in advanced calculus provide basic knowledge about sequence, convergence. Introduce continuity of functions, maxima and minima of function of two variables.

Learning Outcomes –

At the end of the course the students should be able to

- Known what is sequence and convergence. They will also known about different types of test of convergence.
- They will learn about partial differentiation, Euler's function and Jacobins.
- They will know about Envelops and evaluates maxima and minima.

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – III

Title of the paper – Differential Equations

Subject Nature – Compulsory

Course Objective –

In this paper students enhance their knowledge about power series, Bessel's and Legendre's function. Introduce Laplace transformation and its linearity. To enforce the students with the Char pit's general method. Homogeneous and non-Homogeneous equation.

Learning Outcomes –

At the end of the course the students should be able to

- Study Bessel's and Legendre's equations they will learn Laplace Transformation.
- They will study inverse Laplace transform and its application.
- Enhance their knowledge about partial differential equations and Lagrange's solution.

Department of Mathematics
Syllabus session – 2020-21
Class B.Sc. I year

Title of the paper: – Algebra and Trigonometry

Subject Nature – Compulsory

Examination scheme :

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks -	Theory maximum marks -	Theory maximum marks -
CCE maximum marks -	CCE maximum marks -	CCE maximum marks -

Course Objective –

To enforce the students with the Matrix and solving linear equations upto three unknowns. To provide the foundation of Logic and circuits so that it would be applicable in real life problem.

Learning Outcome –

At the end of the course students should be able to -

- Find the rank of matrix, solve system of equations.
- Learn about relation b/w the roots and coefficients.
Enhance the knowledge of logical connectives.
- Get knowledge about direct and inverse circular and hyperbolic functions.

Department of Mathematics

Syllabus session – 2020-21

Class B.Sc. I year

Title of the paper: – Calculus and Differential Equations

Algebra and Trigonometry

Subject Nature – Compulsory

Course Objective –

To enforce the students with the successive differentiation and curvatures. To provides the foundation of Linear differential equations. So that it would to helpful to students to solve the higher degree equations. The course is also provides the basic of geometrical meaning of differential equations.

Learning Outcome –

At the end of the course students should be able to

- To find successive differentiation and get knowledge about curvature.
- Enhance the knowledge of integration and reduction formula.
- Learn about geometrical meaning of a differential equation.

Department of Mathematics

Syllabus session – 2020-21

B.Sc. I year

Paper – III

Title of the paper– vector Analysis and Geometry

Subject Nature – Compulsory

Course Objective –

To enforce the students with the product of four vectors. Introduce vector integration and some theorem. To provide the knowledge of tracing of conics.

Learning Outcomes –

At the end of the course the students should be able to

- To find gradient, divergence and curl of any function.
Enhance the knowledge of vector integration.
- The student will be known about conical surfaces and enhance their knowledge about hyperboloid of one and two sheets and their properties.

Department of Physics
Syllabus session – 2020-21
Class B.Sc. I year

**Title of the paper: – MATHEMATICAL PHYSICS, MECHANICS
AND PROPERTIES OF MATTER**

Subject Nature – Compulsory

Examination Scheme :

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical -50	

Course Objective :

1. The course would empower the students to develop the idea about the behavior of physical bodies
2. It will provide the basic concepts related to the motion of all the objects around us in daily life.
3. The students will acquire the knowledge of basic mathematical methods and understand the relativistics effect and the relation between energy and mass.
4. The course would enable the students the understands the basic physics of the heat and temperature in relation to energy, work, radiation and matter.
5. The students are accepted to learn laws of thermodynamics and students will understands the importants of studying of statistical mechanics with the behavior of the particle under classical and quantum conditions.

Learning Outcome :

At the end of the course students should be able to :

The students would be able to build foundation to various applied field in science and technology specially in the field of mechanical engineering .

This course will also develop and understanding of the various concepts of statistics and methods to apply then in thermodynamics.

Course Contents :

(PAPER - I)

MATHEMATICAL PHYSICS, MECHANICS AND PROPERTIES OF MATTER

UNIT – I (MATHEMATICAL PHYSICS)

The course will enable the students to develop ideas about the behavior scalar and vector field, Gradient , Divergence, Curl and numerical problems based on the above topics.

UNIT- II (MECHANICS)

The course gives details about the basic concept of Newtons law of motions and its explanation with problems, various types of force in natures. Kepler's law, Gravitational law, Gravitational self energy, Center of mass and reduced mass, elastic and inelastic collision.

UNIT- III (GENERAL PROPERTIES OF MATTER)

This course is useful in explaining to the students the basic concept Elastic moduli and their relation, surface tension, angle of contact and application of surface tension and concept of viscous force and viscosity .

UNIT- IV (oscillators)

Course introduces students to Concept of simple, periodic and harmonic oscillation with illustration kinetic and potential energies of harmonic oscillators, moment of inertia and motion of rigid bodies.

UNIT- V (Relativistic mechanics)

The course provides students about the Michelson morley experiment and its outcomes postulates of special theory of relativity, Lorentz transformation, Doppler effect and earlier developments of physics up to eighteenth century.

Department of Physics
Syllabus session – 2020-21
Class B.Sc. I year

Title of the paper: – THERMODYNAMICS AND STATISTICS PHYSICS

Subject Nature – Compulsory

(PAPER - II)

UNIT – I (THERMODYNAMICS-I)

Syllabus provide the students about the Basics concepts of reversible and irreversible process heat engine, steam engine, petrol engine and carnot cycle and its application.

UNIT – II (THERMODYNAMICS-II)

Syllabus provide the students concepts of entropy, change of entropy in adiabatic process, principle of increase of entropy T-S Diagram, Third laws of Thermodynamics and relation between Thermodynamics variables.

UNIT – III (STATISTICAL PHYSICS-I)

Syllabus provide the students Description of a system, significant of statistical approach particle state, equilibrium state, classical and statistical probability, statistical ensemble and Gibbs free energy,

UNIT – IV (STATISTICAL PHYSICS-II)

From the course students learn statistical mechanics, phase space, probability of distribution, MB statistics, quantum statistics, partition function, BE statistics, FD statistics Black body radiation in concept of phase transitions.

UNIT – V (Contribution of physicists)

From the syllabus students study Contribution of physicists – M.N. Saha, S.N.Bose, Mexwell, Clausius, Bohr, Joule, Wien, Einstein

Department of Mathematics

Session – 2020-21

Class B.Sc. III year

Subject Name – Linear Algebra and Numerical analysis

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 40	Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks - 10	CCE maximum marks - 10

Paper – I

Course Objective –

To enforce the students with the vector spaces and sub spaces. To provides the foundations of numerical analysis and linear transformation. The course is also provides the different methods for solution of equations.

Learning Outcomes –

At the end of the course students should be able to

- Understand relation between linear transformation and matrix representation.
- Use the concept of inner product space to find norm of vector.
- After completing numerical analysis they will be able to find solution of different equations.

Department of Mathematics

Session – 2020-21

B.Sc. III year

Subject Name – Real and Complex Analysis

Subject Nature – Compulsory

Paper II

Course Objectives-

This course contains the different types of integrals. The course enforces the students with integral calculus. This course provides the foundation of Metric spaces and continuous functions. The course also provides series solution of analytical function.

Learning Outcomes –

At the end of the course students should be able to

- Solve the problem based on convergence.
- In the part of metric spaces they learn to find neighbourhoods, limit points etc.
- They get knowledge about power series representation of an analytical function.

Department of Mathematics

Session – 2020-21

B.Sc. III year

Subject Name – Discrete Mathematics

Subject Nature – Compulsory

Paper III

Course Objective –

To enhance the knowledge of student in discrete mathematics and enforce the students with the Boolean functions. To provide the foundation of graph theory and its properties. The course also provides the methods of matrix representation of graphs.

Learning Outcomes –

At the end of the course the students should be able to

- Solve problems related with discrete objects and binary relations, graphical representation of objects.
- They will study a special type of relation that is exceptionally useful in a variety of computer science application.

Department of Physics

Session – 2020-21

B.Sc. III year

Title of the paper: QUANTUM MECHANICS

Subject Name – PHYSICS

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical Marks - 50	

Paper I

Paper Name - Course Objective : To enforce the students with the strength of physics fundamentals and scope of quantum mechanics, solid state physics and semiconductor devices.

To provide the foundation for 360 degree dimensional platform of technology and science so that it would open vistas for profession, research and career.

Learning Outcome :

At the end of the course students should be able to :

The course includes examples to explain the quantization of energy, wave-particle duality, and tunnelling. This knowledge contributes to a better understanding of elementary nuclear and particle physics, as well as the composition of atoms, molecules and materials.

The course gives an introduction to solid state physics, and will enable the student to employ classical and quantum mechanical theories .

B.Sc. III Year (PAPER - I)

UNIT – I (QUANTUM MECHANICS-I) PARTICLES AND WAVES

From the syllabus, the students study the basic concepts of quantum mechanics and from this understand the photo electric effect, compton effect and dual nature of particle. With this, students can study the Schrödinger wave equation in detail.

UNIT – II (QUANTUM MECHANICS-2)

Students study the tunnel effect and its applications from the course

UNIT – III (ATOMIC SPECTROSCOPY)

Students study the behavior of electrons from the course And from this student studies Pauli exclusion principle, atomic shell model and Zeeman effect and X-ray spectrum.

UNIT – IV (MOLECULAR SPECTROSCOPY)

From the syllabus students study the construction of atoms and molecules using atomic spectroscopy.

UNIT – V (NUCLEAR PHYSICS)

From the syllabus, the students study the construction of the nucleus and its basic properties. With its help, students can easily understand the nuclear fusion and nuclear fission and nuclear reaction in stars.

Department of Physics

Session – 2020-21

B.Sc. III year

Subject Name – PHYSICS

Subject Nature – Compulsory

PAPER - II

UNIT – I (SOLID STATE PHYSICS -I) CRYSTAL STRUCTURE AND BONDING

Students study crystal structure and its types from the syllabus with the help of this students can easily bonding in solids.

UNIT – II (SOLID STATE PHYSICS -II) LATTICE STRUCTURE AND PROPERTIES

From the syllabus students study about the specific heat of solids and effect of temperature on the specific heat of solids.

With the help of this students can easily understand free electron motion in solids and metal.

With the help of this students can easily understand diamagnetic, paramagnetic and ferromagnetic substance

UNIT – III (SEMICONDUCTOR DEVICES -I) ELECTRONIC DEVICES

From the syllabus students study formation of energy band in solids and semiconductor devices.

UNIT – IV (SEMICONDUCTOR DEVICES -II)

From the syllabus students study amplifier oscillator and semiconductor devices. From the syllabus students study about the modulation and its use in daily life.

UNIT – V (NANO MATERIALS)

From the syllabus students study construction of nano materials , properties and application of nano materials.

M.sc-II Year(CS)

M.sc-III sem

CS-301 Object Oriented Programmig using JAVA

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

The main objective of this course is to understand and implement various concepts of numerical analysis and statistics to solve real life problems.

Learning Outcomes:

On completion of this course, The learners will able to-

- 1.Understand the basic terminology of advance programming language
2. Complete life cycle of programming language
3. Lerner will understand difference between c, cpp and java

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
- 2.Each theory question paper will contain 5 question of 2 sub part of 17 marks.
- 3.Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

CS - 301 Object Oriented Programming Using JAVA

Max. Marks : 50

Min. Marks : 17

Unit No.	Topics
Unit 1	<p>Introduction to java: Features of Java, Object-oriented programming overview, Introduction of Java Technologies, How to write simple Java programs, Data Types, Variables, Memory concepts, decision making operators, Naming Conventions, Introduction to Class, Objects, Methods and Instance Variables, Primitive type Vs Reference Type, Initializing Objects with Constructors. Type conversion & casting, Operators, Control Statements(if Single-Selection Statement, if-else Double Selection), while Repetition Statement, for Repetition Statement, do-while Repetition Statements, switch Multiple-Selection Statement, break and continue Statements. Static Method, static field and Math Class, Method Call Stack and Activation Record, Argument Promotion and Casting, Scope of declaration and Method Overloading.</p>
Unit 2	<p>String Handling: The String constructors, String operators, Character Exaction, String comparison, String Buffer.</p> <p>Arrays: Declaring and Creating Arrays, Enhanced for Statement, Passing Arrays to Method, Multidimensional Arrays, Variable-Length Argument lists, Using Command-line Arguments. final Instance Variables, this reference, static import, overloaded Constructors, Garbage collection and method finalize , Overloading methods, Parameter passing.</p>
Unit 3	<p>Inheritance: Extending classes, protected Members, relationship between Superclasses and Subclasses, Using super, Constructor in Subclasses, The Object Class, Object Copying in Java.</p> <p>Polymorphism: Method overriding, upcasting, Dynamic Method Dispatch, final Method and classes, Abstract classes and Methods, instanceof operator, Downcasting, Class class, Runtime type Identification</p> <p>Packages and Interfaces: Defining a Package, Understanding CLASSPATH, Access Protection, Importing packages, creating own packages. Defining an Interface, Properties of interface, advantages of interface Achieving multiple inheritance through interfaces, Variables in Interfaces, Comparable interface.</p>
Unit 4	<p>Exception Handling: Introduction, overview of doing it and keywords used, when to use it, Java Exception Hierarchy, finally block, chained exceptions, declaring new exception types, preconditions and postconditions.</p> <p>Streams and Files: Introduction, Data Hierarchy, Files and Streams, Sequential-access Text Files, Object Serialization, Random-Access files, Java Stream class Hierarchy.</p> <p>Multithreading: What are threads, The java thread model, Thread priorities, Thread life cycle, Creating thread and executing thread, Thread Synchronization, producer-consumer problem without Synchronization, Producer-consumer problem with Synchronization, Other class and Interfaces in java.util.concurrent, Monitor and Monitor Locks, Thread Groups, Synchronization, Inter-thread Communication.</p>
Unit 5	<p>Introduction To GUI : Introduction, Overview of swing Components, Displaying text and Images in a window, Introduction to Event Handling, Common GUI Event Type and Listener Interfaces, How Event Handling Works, Adapter Classes, Layout Managers</p> <p>Applets: Applet basics, Applet Architecture, Applet life cycle methods, Applet HTML Tag and attributes, Executing applet in web browser and in the appletviewer, in Passing parameters to Applets, doing GUI programming in applet</p> <p>Generic and Collection API: Introduction, Motivation for Generic Methods, Generic Methods : Implementation and Compile- time Translation Issues, Overloading Generic Methods, Generic Classes, Raw Types, Generic and Inheritance</p> <p>Database connectivity: JDBC, The design of JDBC, Typical uses of JDBC, The Structured Query language, Basic JDBC Programming concepts, Executing Queries.</p>

-

TEXT BOOK:

1 Java2 : The Complete Reference by Herbert Schildt, Tata McGraw- Hill, fourth Edition, 2005

REFERENCE BOOKS:

1. 1. JAVA How to Program by Deitel & Deitel, Pearson Education, Seventh
2. Thinking in Java by Bruce Eckel , Prentice Hall, Third Edition, 2005
3. Core Java 1.2: Volume 1 Fundamentals by Gary Cornell, Cay Horstmann, Prentice Hall, Seventh Edition, 2007

.

**CS - 302 Database Applications and Tools
Session 2020-21**

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

- This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration.

Course Learning Outcomes:

On completion of this course, students will be able to:

- Understand the advance concepts and the applications of database systems.
- Improve the database design by normalization.
- Convert the ER-model, EER model to relational tables, populate relational database and formulate SQL.
- Familiar with data warehouse, data mining, UML diagram, Distributed database.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit No.	Topics
Unit 1	Database Environment: Data versus information, traditional file processing, disadvantages, database approach, range of database application, advantages of database approach. Cost and risk factors, components of database environment, evolution of database system.
Unit 2	Database Development Process: Information engineering, information architecture, enterprise data model, planning, SDLC, CASE etc. Steps of planning, strategic planning factors, corporate planning objects. Developing preliminary data model, and use of planning matrices, SDLC steps, CASE role, people in database development, three-schema architecture for database development. Examples to demonstrate the development process. Modeling Data in the Organisation: Modeling of the rules of organization, data names and definitions, ER model constructs entities and its types, attributes, relationships, degree, unary, binary, ternary, n-ary, cardinalities constraints, ER modeling examples.
Unit 3	Enhanced ER modeling: supertype, subtypes, specialization, generalization, specifying constraints in EER models, completeness, Disjointness, discriminators, defining super/sub type hierarchies, EER modeling examples, live demos modeling for few scenarios. Logical database design and relational model development, Relational model properties, keys, primary, secondary, composite, properties of relations. Codd's rules, integrity constraints, creating relational tables, Transform EER diagrams into relations, seven different steps for mapping EER model into relations,
Unit 4	Introduction to normalization, steps, functional dependencies, basic normal forms, definition of first, second, third normal form and removing anomalies from the relations. De-normalization and merging relations.

Unit 5	Special Topics (Overview) : Data Warehousing, Data Mining, Distributed Databases, Object oriented modeling, definitions, activities in phases of model development, advantages of OOM, UML class diagrams, Example of a model development.
<ol style="list-style-type: none">1. Text Book : "Modern Database Management" Seventh Edition, Hoffer, Prescott, McFadden Pearson Education"2. Reference books :<ol style="list-style-type: none">1. Database Systems "Thomas M. Connolly, Carolyn E. BeggPearson Education.2. Raghu R and Johannes G., "Database management Systems", Mc Hill 3rd Ed 2002, Elmasri R, Navathe S, "Fundamentals of Database Systems"	

CS-303 Theory of Computation

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives (CoB): The course is aimed at

- introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.
- enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

Course Outcome

Upon successful completion of this course, student will be able to

- discuss key notions of computation, such as algorithm, computability, decidability, reducibility, and complexity, through problem solving.
- explain the models of computation, including formal languages, grammars and automata, and their connections.
- state and explain the Church-Turing thesis and its significance.
- analyze and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
- solve computational problems regarding their computability and complexity and prove the basic results of the theory of computation.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

CS - 303 Theory of Computation

Max. Marks : 50

Cln. Stars : 17

Unit No.	Topics
Unit 1	The Theory Of Automate: String, Alphabets and Languages, Finite Automate, Finite State Machine, Basic Definition. Description of a Finite Automaton Deterministic Finite Acceptors- Transition Graphs, Languages, Non- Deterministic Finite Acceptors- Definition, Finite Automata with ε- moves Equivalence of Deterministic and Non-deterministic Finite Acceptors, Mealy and Moore models- Definitions, Transformation of Mealy Machine into Moore Machine and vice-versa.
Unit 2	Conversion of NFA to DFA Removal of ε transition from ε-NFA The Myhill-Nerode theorem and Minimization of Finite Automata — Definition and Construction. Properties of Regular Sets: Pumping lemma for regular set, Closure properties of regular set.
Unit 3	Formal Language: Basic Definition Chomsky Classification of languages, Initialization of Finite Automata Regular Expression Language Regular Expressions, Correction between Regular Expressions and Regular Languages Regular Grammars — Right and Left Linear Grammars, Equivalence between Regular Languages and Regular Grammars
Unit 4	Context-Free Grammars: Leftmost and Rightmost Derivations, Derivation Trees, Parse and Ambiguity, Simplification of CFGs, Chomsky Normal Form Greibach Normal Form Cocke-Kasami-Younger Algorithm Properties of Context-Free Languages.
Unit 5	Pushdown Automate: Definition Non-deterministic Pushdown Automate, Pushdown Automata for Context Free Languages. Context-Free Grammars for Pushdown Automata. Deterministic Pushdown Automata and Deterministic Context-Free Languages. Turing Machine: Definition of Standard Turing Machine, Turing Machine as Language Acceptors and Transducers.

<ol style="list-style-type: none"> 1. Text Book : Mishra and Chaudrasekara Theory of Computer Science (Automata, Language and Computation), 2nd Ed. Prentice Hall of India. 2. Reference books : <ol style="list-style-type: none"> 1. .Maini, J.C.: Introduction to Languages and the Theory of Computation, McGraw- Hill Doc., 3rd ed., 2002. ISBN 0-072-32200-4. 2 Brookshear, J.G.: Theory of Computation: Formal Languages, Automata, and Complexity, The Benjamin/Cummings Publishing Company, Inc, Redwood City, California, 1989. ISBN 0-805-30143-7 3 Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publishing House.

CS-304 Computer Graphics and Multimedia

Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES:- The main objective of this syllabus is to introduce to the students the concepts of computer graphics. It starts with an overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation; Clipping, filling and an introduction to 3-D graphics.

LEARNING OUTCOMES:

- Knowledge and understanding - Have a knowledge and understanding of the structure of an interactive computer graphics system, and the separation of system components.
 - Have a knowledge and understanding of geometrical transformations and 3D viewing.
 - Have a knowledge and understanding of techniques for representing 3D geometrical objects. - Have a knowledge and understanding of interaction techniques.
- Cognitive skills (thinking and analysis). - Be able to create interactive graphics applications.
- Practical and subject specific skills (Transferable Skills). - Perform simple 2D graphics with lines, curves and can implement algorithms to rasterizing simple shapes, fill and clip polygons and have a basic grasp of anti-aliasing techniques.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

CS - 304 Computer Graphics & Multimedia

Max. Marks : 50

Min. Marks : 17

Unit No.	Topics
Unit 1	Introduction to Computer Graphics , Application of Graphics, Display Devices: Refresh Cathode -Ray Tubes, Raster Scan Displays, Random Scan Displays, Color CRT Monitors, Flat Panel Displays. Video cards/display cards Input Devices: Mouse, Trackball, Space ball, Data Glove, Joystick, Light pen, Scanner, Digital Camera, Touch Panels, Voice Systems. Hardcopy Devices: Printers and Plotters
Unit 2	Graphics Primitives: Line Generation Algorithms: DDA algorithm, Bresenham's algorithm. Graphics Primitives: Circle Generation Algorithms: Midpoint Circle algorithm, Bresenham's circle generation algorithm. Ellipse Generation algorithm. Graphics Primitives: Polygon filling Algorithms: Scan Line Polygon fill algorithm, Inside - Outside Tests, Boundary-Fill algorithm, Flood - Fill algorithm. Fundamentals of aliasing and Antialiasing Technique.
Unit 3	Clipping: Clipping operations, Point clipping, Line clipping: Cohen Sutherland Algorithm, Liang Barsky Algorithm, Nicholl-Lee-Nicholl Algorithm. Polygon clipping: Sutherland- Hodgeman Algorithm, Weiler Atherton Algorithm. Text clipping, Exterior clipping.
Unit 4	Two Dimensional Transformations: Translation, Scaling, Rotation, Reflection, Shear, Homogenous coordinate system, composite transformations, raster method of transformation Two Dimensional Viewing: Window to Viewport coordinate transformation, Three Dimensional: 3D Geometry, 3D display techniques, transformations. Projections: Parallel Projection, Perspective Projection.
Unit 5	Color Models and Color Application: Color models: Properties of Light. Standard Primaries and the Chromaticity Diagram, XYZ Color Model, CIE Chromaticity Diagram. RGB Color Model, YIQ Color Model, CMY Color Model, HSV Color Model. Conversion between HSV and RGB Models. HLS Color Model, Color Selection and Application. Advancements in the technology in Computer Graphics.

Reference Book:- Computer Graphics: Donald Hearn and M. Pauline Baker, Second Edition, Prentice Hall of India

CS-305 Computer Network
Session 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

1. To develop an understanding of computer networking basics.
2. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications. Course Outcomes

Course Outcomes

After successfully completing this course, students should be able to:

- Describe the general principles of data communication.
- Describe how computer networks are organized with the concept of layered approach.
- Describe how signals are used to transfer data between nodes.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given data link layer packet, based on the layer concept.
- Design logical sub-address blocks with a given address block.
- Decide routing entries given a simple example of network topology
- Describe what classless addressing scheme is.
- Describe how routing protocols work.
- Use C programming language to implement network programs.
- Design and implement a network protocol.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit-No	Topics
Unit-1	Introduction: Computer Network, Goals and Applications, Reference models – OSI and TCP/IP. A Comparative study. LAN, MAN and WAN and topologies, LAN components – File server, Workstations, Network Adapter Cards. Connection Oriented and Connection less services, Switching Techniques – Circuit Switching, Packet Switching.
Unit-2	Data Link Layer: Design Issues, Framing, Error Detection: Parity Check, Check Sum and Cyclic Redundancy Check (CRC); Correction Technique: Hamming code. Flow Control: Elementary Data Link Protocols: An Unrestricted Simplex Protocol, Simplex Stop-and-Wait Protocol, Sliding Window Protocols: One-Bit Sliding Window Protocol Go Back N and Selective Repeat. Data link layer in the Internet: SLIP and PPP.
Unit-3	Sublayer: Multiple access protocols: Aloha, CSMA Protocols; CollisionFree Protocols; IEEE MAC Sublayer protocols: 802.3 802.4, 802.5 and their management. High speed LANs – Fast Ethernet, FDDI, Wireless LANs
Unit-4	Network Layer: Design issues, Routing Principles. Routing Algorithms: Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing. Link State Routing, Hierarchical Routing, Broadcasting Routing, Multicast Routing, The Network Layer in the Internet: Internet Protocol, Internet addressing and Internet Control protocols.
Unit-5	Transport Layer: Elements of Transport Protocols, Addressing, Connection Establishment, Connection Release, Flow Control and Buffering, Multiplexing. The Internet Transport Protocol UDP: Introduction to UDP. Introduction to TCP, The TCP Service Model, The TCP Protocol. Application layer: Client Server Architecture, DNS, WWW and HTTP, Cookies, Proxy Server. E-mail Protocols (SMTP, POP3, IMAP, MIME), FTP, TELNET. Network Security: Cryptography, Symmetric- key Algorithms, Public- key Algorithms, Digital Signatures.

TEXT BOOK:

1. B. A. Forouzan – “Data Communications and Networking (3rd Ed.) “ – TMH
2. A. S. Tanenbaum – “Computer Networks (4th Ed.)” – Pearson Education/PHI
3. W. Stallings – “Data and Computer Communications (5th Ed.)” – PHI/ Pearson Education

REFERENCE BOOKS:

1. Kurose and Rose – “Computer Networking -A top down approach featuring the internet” – Pearson Education
2. Leon, Garica, Widjaja – “Communication Networks” – TMH
3. Walrand – “Communication Networks” – TMH.

Semester –IV

CS 401– Linux/Unix Administration

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives (CoB): The course is aimed at

1. To understand and make effective use of Unix/ linux utilities and shell scripting language to solve problems
2. To implement in C some standard Unix/linux utilities like mv,cp,ls etc...
3. To Develop the skills the necessary for systems programming including file system programming, process and signal management and inter-process communication
4. To develop the basic skills required to write network programs using sockets

Expected Course Outcome (CO):

At the end of the course the student should be able to:

1. Explain the structure and functions of operating systems along with their components, types and working.
2. Make use of appropriate Unix/Linux commands for memory management, file management and directory management.
3. Analyze the performance of different scheduling algorithms along with the policies for concurrency and deadlock management.
4. Elaborate the system calls for process management and file management.
5. Understand the basic set of commands and editors in Linux operating system.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

CS - 401 Linux/ Unix Administration

Max. Marks : 50

Min. Marks : 17

Unit No.	Topics
Unit 1	Background: Evolution of Unix OS. Unix implementations. Features of Unix operating system. Linux operating system: Development of Linux. Applications of Linux operating system.
Unit 2	Basic UNIX environment: Basic commands, directory management, pipes, tee, I/O redirection and other utilities. Advanced commands: File system and process management commands, Shell, Pattern matching, Navigating the File Systems.
Unit 3	Unix editor: VI editor, Creating new files. Text addition, deletion and changes. Dealing with sentences and paragraphs. Searching. Cut, paste and copy. Running C/C++ programs. Shell programming: Features of shell. Shell variables. Control statements. Advance shell programming: Command line arguments. Interactive shell scripts. Debugging of shell scripts. Communication facilities in Unix.
Unit 4	Structure of unix operating system: Structure of unix kernel, Unix system calls. Unix system: File system calls, Process management calls. Advance Filter: Awk: Number processing, Interface with shell, functions.
Unit 5	Unix system administration: Adding and removing users. User accounting. Adding and removing hardware. Performing backups and restore. Disk space management. Unix system administration: Configuring the kernel. Network management in Unix. Performance analysis. Unix Desktop.

1. Text Book :

UNIX Operating Systems: Sumitabh Das, Tata McGraw Hills publication.

2. Reference books :

1. **UNIX System Administration Handbook**(Second edition): Evi Nemeth, Garth Synder, Scott Seebass, Trent R Hein, Pearson Education - Asia, 2000.

2. **C: Design of UNIX Operating System:** Maurice J. Back, Pearson Education - Asia.

CS-402- Compiler Design

Session-2020-2021

Subject Nature	Compulsory
-----------------------	-------------------

COURSE OBJECTIVES

The objective of this course is to:

1. Provide an understanding of the fundamental principles in compiler design
2. Provide the skills needed for building compilers for various situations that one may encounter in a career in Computer Science.
3. Learn the process of translating a modern high-level language to executable code required for compiler construction.

COURSE OUTCOMES

At the end of course students will be able to:

1. Understand fundamentals of compiler and identify the relationships among different phases of the compiler.
2. Understand the application of finite state machines, recursive descent, production rules, parsing, and language semantics.
3. Analyze & implement required module, which may include front-end, back-end, and a small set of middle-end optimizations.
4. Use modern tools and technologies for designing new compiler.

Examination Scheme-

The end of semester examination will be worth 15 marks having

assignment/test .

1. Each theory question paper will contain 5 question of 2 sub part of 17 marks.

2. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit No	Topics
Unit-1	Compiler, Translator, Interpreter definition, Phase of compiler introduction to one pass & Multi pass compilers. Analysis of source program, duties of 6 phases. Review of Finite automata lexical analyser, Input, buffering, Recognition of tokens, Idea about LEX: A lexical analyser generator, Error handling.
Unit-2	Introduction to parsing. Bottom up parsing Top down parsing techniques. Shift reduce parsing, Operator precedence parsing, Recursive descent parsing predictive parsers. LL grammars & passers error handling of LL parser. LR parsers, Construction of SLR.
Unit-3	Conical LR & LALR parsing tables, parsing with ambiguous grammar, Syntax directed definitions; Construction of syntax trees, L~attributed definitions, Top down translation. Intermediate code forms using postfix notation and three address code.
Unit-4	Representing TAC using triples and quadruples, Translation of assignment statement. Boolean expression and control structures. Definition of basic block control flow graphs, DAG representation of basic block.
Unit-5	Advantages of DAG, Sources of optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole optimization Issues in design of code generator, A simple code generator, Code generation from DAG. Code Optimization.

TEXT BOOK:

1. ALFRED V AUTOR AHO, JEFFREY D AUTOR ULLMAN "Principles of Compiler Design".
2. V Raghvan, " Principles of Compiler Design", TMH
3. Kenneth Loudon," Compiler Construction", Cengage Learning.

REFERENCE BOOKS:

1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education2
2. Charles Fischer and Ricard LeBlanc," Crafting a Compiler with C", Pearson Education

CS-403 Internet and Web Technologies
Session-2020-2021

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

Learning Outcomes:

The student will be able to: • Analyze a web page and identify its elements and attributes. • Create web pages using XHTML and Cascading Style Sheets. • Build dynamic web pages using JavaScript (Client side programming). • Create XML documents and Schemas. • Build interactive web applications using AJAX.

Examination Scheme-

The end of semester examination will be worth 15 marks having
assignment/test .

3. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
4. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

CS - 403 Internet and Web Technology

Max. Marks : 50

Min. Marks : 17

Unit No.	Topics
Unit 1	Introduction Dynamic Web Programming, HTML Forms, scripting languages, Introduction to HTTP, web Server and application Servers, Installation of Application servers, Configuration files, Web.xml. Java Servlet, Servlet Development Process, Deployment Descriptors, The Generic Servlet Lifecycle.
Unit 2	Servlet Packages, Classes, Interfaces, and Methods, Handling Forms with Servlets. Various methods of Session Handling. Various elements of deployment descriptors. Java Database Connectivity: various steps in process of connection to the database, Various type of JDBC Driver.
Unit 3	Connection of JSP and Servlet with different database viz. Oracle, MS-SQL Server, MySQL. java.sql Package. Accessing metadata from the database. Type of Statement, Connection pooling: multiple users and need of connection pooling.
Unit 4	JSP Basics: JSP lifecycle, Directives, scripting elements, standard actions, implicit objects. Writing JSPs. Expression Language (EL), Separating Business Logic and Presentation Logic, Building and using JavaBean.
Unit 5	Session handling in JSP, Types of errors and exceptions handling, Standard Tag Library in JSP, Building Custom Tag Library, JSP Tag Library, MVC Design pattern Advances in J2EE and Other Web technology

1. Text Book :

Kevin Mukhar, Chris Zelenak, James L. Weaver, "Beginning Java EE 5: From Novice to Professional" Apress

2. Reference books :

1. Marty Hall, Larry Brown, "Core Servlets and Java Server Pages", 2nd edition, Pearson Education
2. JavaDoc for various technologies
3. Internet and Web technologies, TMH, 2002

CS-404- Design and Analysis of Algorithms

Unit No.	Topics
----------	--------

Subject Nature	Compulsory
-----------------------	-------------------

Course Objective:

- To develop proficiency in problem solving and programming.
- To be able to carry out the Analysis of various Algorithms for mainly Time and space complexity.
- To get a good understanding of applications of Data Structures.

Course Learning Outcomes:

On completion of this course, students will be able to Ability to decide the appropriate data type and data structure for a given problem.

- Ability to compare algorithms with respect to time and space complexity
- Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.

Examination Scheme-

The end of semester examination will be worth 15 marks having assignment/test

5. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
6. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit 1	<p>Order Analysis: Objectives of time analysis of algorithms; Big-oh and Theta notations.</p> <p>Master Theorem and its proof, solution of divide and conquer recurrence relations. Searching, Sorting and Divide and Conquer Strategy: Linear Search, Binary Search.</p>
Unit 2	<p>Searching, Sorting and Divide and Conquer Strategy: Merge-sort, Quick-sort with average case analysis. Heaps and heap-sort. Lower bound on comparison-based sorting and Counting sort. Dynamic Programming methodology and examples (Fibonacci numbers, Knapsack problem and some other simple examples)</p> <p>Dynamic Programming: Longest integer subsequence, Longest common subsequence, Weighted interval scheduling.</p>
Unit 3	<p>Greedy Method: Methodology, examples (lecture Scheduling, process scheduling) and comparison with DP (more examples to come later in graph algorithms)</p> <p>Greedy Method: Knapsack problem and some other simple examples.</p> <p>Graph Algorithms: Basics of graphs and their representations. BFS. DFS. Topological sorting.</p>
Unit 4	<p>Minimum spanning trees (Kruskal and Prim's algorithms and brief discussions of disjoint set and Fibonacci heap data structures). Shortest Paths (Dijkstra, Bellman-Ford, Floyd-Warshall). Hard problems and approximation algorithms. Problem classes P, NP, NP-hard and NP-complete, deterministic and nondeterministic polynomial-time algorithms. Approximation algorithms for some NP-complete problems.</p>
Unit 5	<p>Backtracking, Branch and Bound technique, String Matching, Knapsack algorithm, KMP algorithm, Parallel Algorithms</p>

1. TextBook :

Cormen, Leiserson, and Rivest. *Algorithms*, MIT Press 2001

2. Reference books:

1. Essential References ALGORITHMS IN C++ by Robert Sedgewick (Pearson Education) 2008
2. Fundamentals of Computer Algorithms by Ellis Horowitz and Sartaj Sahni (Galgotia Publication 1998)

M.Sc. (Computer Science)

I semester

CS-101 Computer Fundamental and Communication

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

The subject aims to provide the student with:

1. An understanding of various Number Systems & Codes along with Boolean algebra.
2. An ability to solve Boolean algebra problems.
3. An ability to design combinational and sequential circuits.
4. An understanding of programmable logic devices.

Course Outcomes

After successfully completing this course, students should be able to:

1. Convert the numbers from one radix to another and perform arithmetic operations using the 1's and 2's compliments.
2. Solve Boolean Expressions using Boolean algebra, K-maps and VEM and implement them using logic gates.
3. Design any given combinational circuits.
4. Explain different flip flops, registers and their applications.
5. Design sequential circuits and state machines.
6. Design synchronous and asynchronous counter circuits.
7. Explain arithmetic circuits like adders and multipliers and their applications.

8. Compare the characteristics of programmable logic devices.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.

	Topics	CLO(course Learning Outcomes)
1	. Computer Organization: Digital and Analog computers, Major components of a digital computer, Memory addressing capability of a CPU, Word length of a computer, Processing speed of a CPU, Definitions of Hardware, Software and Firmware. Definitions of Dumb, Smart and Intelligent terminals. Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes: BCD code, Gray Code, ASCII code, Excess 3 Code, Error detecting Code. Computer Arithmetic: Binary representation of Negative Integers using 2's complement and Signed magnitude representation, Fixed point Arithmetic operations on Positive and Signed (Negative) Integers like addition, subtraction, multiplication, Booth algorithm for multiplication, and bit pair (fast) multiplication. Division of positive and negative binary numbers	After successfully completing this Unit, students should be able to: 1. Convert the numbers from one radix to another and perform arithmetic operations using the 1's and 2's compliments.
2	Boolean Algebra and Logic Gates: Basic Definitions, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and standard forms, Other Logic operations, Digital Logic gates, Integrated Circuits. Gate-Level Minimization: The K-Map Method, 3 and 4 variable K-Map, Product of sums simplification, Sum of Products simplification,	After successfully completing this Unit, students should be able to: 1.Solve Boolean Expressions using Boolean algebra, K-maps and VEM and implement them using logic gates.

	Don't care conditions, NAND and NOR implementations, Exclusive-OR function.	
3	Combinational Logic: Combinational Circuits, Analysis Procedure, Design Procedure, Binary half adder, binary full adder, binary full subtractor, binary parallel adder, carry propagation delay and Propagation delay calculation of various digital circuits. Fast adder, Decimal Adder, Binary multiplier, magnitude comparator, Parity generator, seven segment display, BCD to excess three code converter, Decoders, Encoders, Multiplexes, and Demultiplexers Synchronous Sequential logic: Sequential circuits, Latches, Flip Flops: SR, D, JK, T. Master Slave JK Flip flop. Characteristic equations and Excitation tables of flip-flops. Analysis of clocked sequential circuits: State diagrams, State equations for D, JK and T Flip flops. State reduction methods using all Flip Flops. Mealy and Moore Models. Unit 4 Shift Registers- Serial in Serial out, Serial in Parallel out, Parallel in Serial out	After successfully completing this Unit, students should be able to: <ol style="list-style-type: none"> 1. Design any given combinational circuits. 2. Explain different flip flops, registers and their applications
4	Shift Registers- Serial in Serial out, Serial in Parallel out, Parallel in Serial out and Parallel in Parallel out. Designing of Asynchronous (Ripple) Counters, Design of Synchronous Counters. Signal characteristics: frequency, phase and amplitude, Types of communication with and among computers, Characteristics of communication channels, allocation of channel, signal power, amplitude and frequency modulation, space division multiplexing, frequency division multiplexing, Time division multiplexing.	After successfully completing this Unit, students should be able to: <ol style="list-style-type: none"> 1. Design sequential circuits and state machines. 2. Design synchronous and asynchronous counter circuits.
5	Physical communication media: bounded media and unbounded media, Infrared technology, public switched telephone networks, digital modulation: ASK, PSK and FSK, half duplex and full duplex transmission, asynchronous and synchronous transmission. Need for computer communication networks, Internet and world wide web: E-mail, File transfer, Remote login. Networking topologies. LAN, MAN, WAN, Ethernet LAN. Layer 2 and layer 3 switches, Wireless LAN. Switch hub and router. Wireless LAN, interconnecting networks, IP address and IP data grams, Internet and intranet; inter security, virtual private networks, future of Internet technology.	After completing this Unit the student must demonstrate the knowledge and ability to: <ul style="list-style-type: none"> • Understand how the Internet works today. • Independently understand basic computer network technology. • Identify the different types of network topologies and protocols. • Identify the different types of network devices and their functions within a network

-

TEXT BOOK:

1. Digital Design by M. Morris Mano. Publication: PHI Eastern economy edition (Year-2001)
2. Computer Architecture By Nicholas Carter, Schaum Series Adaptation, end edition, 2011 .

REFERENCE BOOKS:

1. Data communications and networking By A. Forouzan Publication: TMH Third edition (Year- 2004)
2. Computer Fundamentals – Architecture and Organization By B. Ram.
3. Computer networks by Andrew Tanenbaum Publication: PHI Fourth edition (Year- 2003)
4. Computer organization and architecture by William Stallings

M.Sc.(Computer Science)

I semester

CS - 102 Programming and Problem Solving Using C

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

Objective of the Course: The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C. Also by learning the basic programming constructs

Course Outcomes

After successfully completing this course, students should be able to:
develop applications.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit-No	Topics
Unit-1	<p>Introduction to Computer based Problem Solving, Classification of programming languages, Programming Environment {Assemblers, compilers, interpreters, linkers, and loaders}. Introduction to Computer based Problem Solving, Features of good programs – Structured program, modular program, fundamentals of programming. Classification of programming languages: low-level language, middle-level language, high - level language along with examples and differences. Programming Environment: Assemblers, compilers, interpreters, linkers, and loaders. Programming Concepts with Flowcharts and algorithms, How to make flowchart: Introduction of the symbols of flowchart and algorithm. Importance of Flowchart and algorithms. Solving and discussing problems with flowchart and algorithm. Class assignment on flowchart. Developing and debugging flowcharts for Programming Problem</p>
Unit-2	<p>Overview of C: C character set, identifiers and keywords. Data types (description of different types of data types along with examples.), Coding style (first program of C). Format Specifiers associated with each data type. Constants and Variables: Some examples of constants and variables. Expressions and Operators: Instructions, declaration, arithmetic, unary, relational, logical, assignment and conditional operators. Basic Input/ Output functions like scanf() and printf() along with examples. Introduction of Formatting Characters and how to use them along with examples. Sequence Control Structures, Decision Control Structures (ifelse and nested if-else) along with examples. Some exercises based on decision control statements. Loop Control Structures: Introduction of loops like for loop and some examples of “for loop”. Examples of do-while loop, while loop, break, continue. Explanation and examples of Case Control Structures. Nesting of loops i.e. loops in a loop along with examples. Introduction of Arrays: Array initialization, bound checking. Programs using 1D Array. Advantages and disadvantages of Arrays. 2D and multidimensional array and programs based on it.</p>
Unit-3	<p>Introduction of Pointers: Pointers declaration, pointer arithmetic and operation. Some programs based on pointers. Concept of Functions: prototype and parameter passing and some programs based on it. Advantages/pitfalls of pointers. Dynamic Memory allocation: malloc() and calloc() functions. Pointers and their Applications: String Handling, Matrices Operations. Call by reference and Call by value. String Handling: Pointers and strings, standard library string functions, pointer to array of characters vs. string and its limitation. Matrices Operations along with examples. Introduction of Storage classes (register, static, auto and extern) and their differences. Introduction of Structures: Structure declaration, program and</p>

	application. Introduction of Union: Union declaration, program and application. Difference between Structure and Union. Some standard Functions like gets(), goto(), puts(), getchar(), putchar(), getch() etc
Unit -4	Introduction of user defined functions along with examples. Functions with arguments, without arguments along with the examples. Communication between functions (how one function calls the other functions). Some exercise based on functions. Arguments to main: Introduction of argc and argv. Enumerations and bit fields and program based on it. Introduction of bit wise operators along with examples. Introduction of Recursion and program based on it. Concept of typedef and its programming.
Unit -5	Concept of Pre-Processors: macro expansion, file inclusion Conditional compilation. Macros with argument and macro versus function. Concept of local and global variables. Header file creation. Introduction to file handling: Different operations on file like read, write and append. File Creation and programs based on file creation, reading and merging. Advanced pointer. Other Programming Techniques.

-

TEXT BOOK:

REFERENCE BOOKS:

1. Programming In Ansi C -by E. Balagurusamy
2. Let us C – by Yashavant P. Kanetkar
3. A First Course in Programming with C- by T Jeyapoovan

M.Sc. (Computer Science)

I semester

CS103 Operating Systems

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

- Define and list the functions of an operating system. list resources involved in process creation and management.
- Explain the use of paging and segmentation
- Explain the function and structure of the I/O system.
- Describe path names and directory structure visible to end users

Course Outcomes

After completion of this course students will be able to: At the end of the course the student will be able to

- 1: Differentiate between multiprocessing, multiprogramming, and multitasking.
- 2: Differentiate between programs, processes and threads.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit-No	Topics
Unit-1	Introduction: Evolution of operating systems, operating system concepts Processor Management: Concepts, Algorithms for batch processing Processor Management Algorithms for time sharing operating systems, Introduction to real time systems.
Unit-2	Memory Management: Concepts, single user memory management. Partition memory allocation Virtual memory management using paging and segmentation techniques
Unit-3	Concurrent Processes: Mutual exclusion and synchronization Techniques of inter process Deadlock handling.
Unit -4	File Management: Operations on a file, structure of a file System Free block list, keeping track of blocks allocated to a file, directory structure, sharing and protection of files, file system Reliability, Unix file system Device Management: Goals of input/output software design, Structure of device hardware and software.
Unit -5	Layers of I/O software, structure of device drivers, Disk driver, disk arm scheduling algorithms, terminal driver, clock driver etc. Introduction to network and distributed operating systems.

-

TEXT BOOK:

1. Operating System Concepts, Addison Wesley, 4th Edition,
2. A. Silberschatz and P. Galvin. 1994. Reference books :

REFERENCE BOOKS:

1. Design of Unix operating system, Bach M., Pearson Education.
2. Operating systems, 4th Edition, William Stallings, Pearson Education, 2003

M.Sc. (Computer Science)

I semester

CS - 104 Discrete Structures

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

The course objective is to provide students with an overview of discrete mathematics. Students will learn about topics such as logic and proofs, sets and functions, probability, recursion, graph theory, matrices, Boolean algebra and other important discrete math concepts.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

- Use logical notation
- Perform logical proofs
- Apply recursive functions and solve recurrence relations
- Determine equivalent logic expressions
- Describe useful standard library functions, create functions, and declare parameters
- Use graphs and trees
- Apply basic and advanced principles of counting
- Define sets and sequences
- Calculate discrete probabilities.
- Design and evaluate Euler and Hamilton circuits

Course Outcomes

After successfully completing this course, students should be able to:

Unit-No	Topics
Unit-1	The Foundations: Logic, Sets and Functions: Introduction to set theory, mathematical logic, prepositions, prepositional equivalences, predicates and quantifiers. Importance of Quantifiers. The Foundations: Logic, Sets and Functions: Sets, set operations, fuzzy sets, functions, functions for computer science, sequences and summations. Mathematical reasoning: Introduction to Methods of proof, mathematical induction. Use of mathematical induction to solve different problems. Importance of recursions in computer science, scope of recursions, Recursive definitions, recursive algorithms
Unit-2	Combinatorics: The basics of counting, The sum rule, The product rule, The Pigeonhole Principle, Permutations with repetitions, Permutations without repetitions, Circular Permutations. Applications of combinations. Applications of Combinatorics to solve Committee problems, word problems, puzzle problems etc. Applications of Combinatorics to understand Telephone numbering plan, understanding Internet addresses, Advanced counting techniques, recurrence relations, solving recurrence relations, algorithm design, Basic understanding of complexities, basic problems of complexity of algorithm
Unit-3	Relations: Relation definition , Importance of relations in computer science, Relations and their properties, Unary relations , Binary relations, Ternary relations , n-ary relations and their applications, closures of relations, equivalence relations, partial ordering. Representing relations, relation matrix, relation graph, composite relation. Operations on relations – union, intersection and join. Concepts of least upper bond, Greatest lower bond, maximal element, minimal element, Greatest element, Least element of a partially ordered set, lattices, sub lattices, chains and antichains
Unit -4	Graphs: Introduction to Graphs, Importance of graph theory in computer science, Graph terminology, representing graphs, graph types, graph models, and graph isomorphism. Connectivity, Euler and Hamiltonian Paths, shortest path problems, planar graphs, graph colouring, chromatic number, Euler's formula, kuratowski's theorem. The four colour problem, Applications of Graph Colouring, Introduction to Trees, applications of trees, tree traversal, trees and sorting, Spanning trees, minimum spanning trees.
Unit -5	Layers of I/O software, structure of device drivers, Disk driver, disk arm scheduling algorithms, terminal driver, clock driver etc. Introduction to network and distributed operating systems.

-

TEXT BOOK:

- Kenneth H. Rosen "Discrete Mathematics and its Applications" , 5th edition , Tata McGraw-Hill Edition. Let us C, Yashavant Kanetkar, BPB Publications.

REFERENCE BOOKS:

1. Kolman, Busby & Ross "Discrete Mathematical Structures" ,5th edition Pearson Education
2. Narsingh Deo "Graph Theory with Applications to Engineering. & Computer Science", 4th edition, Prentice Hall of India .
3. Discrete Structures, Logic and Computability by James L. Hein, 2nd edition, Narosa Publishing House.
4. Discrete and Combinatorial Mathematics, 5th Edition by Ralph P. Grimaldi, Addison-

M.Sc. (Computer Science)

I semester

IC-105 Communication Skills

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives

Objective of the Course:

- Students will be able to understand and evaluate key theoretical approaches used in the interdisciplinary field of communication. I.e., students will be able to explain major theoretical frameworks, constructs, and concepts for the study of communication and language, summarize the work of central thinkers associated with particular approaches, and begin to evaluate the strengths and weaknesses of their approaches.

Course Outcomes

- Students will be able to understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication, etc. from multiple perspectives.
- Students will develop knowledge, skills, and judgment around human communication that facilitate their ability to work collaboratively with others. Such skills could include communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, etc.
- Students will be able to communicate effectively orally and in writing.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
2. Each theory question paper will contain 5 question of 2 sub part of 17 marks.
3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks.

Unit-No	Topics
Unit-1	Fundamentals of Communication (OHP & PPP): Definitions, importance, forms of communication, process of communication, channels, barriers and strategies to overcome barriers of communication. Listening (PPP): Def, Importance, Benefits, barriers, approaches, be a better listener, exercises and cases..
Unit-2	Advance Communication: Why communication? Art of communication, V3 communication, Key elements of IP communication, Quizzes, exercises and cases / incidents for practice
Unit-3	Group Discussions:(PPP) Definitions, importance, process, points to be borne in mind while participating, Dos and Don'ts. Practice- if time permits or to be covered in PDP. Interview (PPP) Types of Interviews, Points to be borne in mind as an interviewer or an Interviewee, commonly asked questions, Dos and Don'ts. Practice- if time permits or to be covered in PDP
Unit -4	Transactional Analysis: (PPP) Transactional analysis, Johari Window, FIRO-B (PPP) Written Communication: Cover letter, Report writing, documentation, business correspondence, preparation of manuals and project reports, Drafting emails.
Unit -5	Negotiation Skill: Basic principles, Building understanding, process of negotiation, essentials of negotiations. Contemporary Communication Styles, technology enabled communication

-

TEXT BOOK:

- 1 Chturvedi, P.D. and Chaturvedi Mukesh (2004), "Business Communication" Pearson

REFERENCE BOOKS:

1. Business Communication by ICMR, Feb 2001.
2. Toropov Brandon (2000), "Last Minute Interview Tips", Jaico Publishing House, Mumbai.
3. Heller Robert (1998), "Essential DK Managers: Communication Clearly", Dorling Kindersley, London.

M.Sc. (Computer Science)

II Semester

CS - 201 Data Structures using C++

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

Upon completion of this course, students will be able to do the following:

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Learning Outcomes: upon successful completion of this course, students should be able to:

- a) Understand the concept of Dynamic memory management, data types, algorithms, Big O notation
- b) Understand basic data structures such as arrays, linked lists, stacks and queues.
- c) Describe the hash function and concepts of collision and its resolution methods
- d) Solve problem involving graphs, trees and heaps
- e) Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test . 2.Each theory question paper will contain 5 question of 2 sub part of 17 marks.

3. Each theory paper is of 85 marks. In which there is an assignment of 15 marks. Also, the practical of 50 marks is taken by the college.

Unit No	Topics
Unit-1	Introduction to C++: Structures, Variables in C++, References, Functions, Function Overloading, Default Values for Formal Arguments of Functions, Inline Functions. Class and Objects: Introduction to Classes and Objects Constructors, destructors, friend function, dynamic memory allocation, Inheritance, Overloading, Polymorphism, Templates.
Unit-2	Definition of data structures and abstract data types. Examples and real life applications Data Structures: Arrays, Stacks, Queues, Dequeues
Unit-3	Linked Lists, Singly and Doubly linked list Applications of Linked Lists, Linked implementation of queue and stacks Binary Search Tree : Definition and Implementation- preorder, post order, inorder traversal, Red Black Tree Definition and implementation
Unit-4	Graphs: Definition and implementation, Hash function, Collision Resolution Techniques, Hashing Applications, Time Complexity, Big – Oh - notation, Running Times, Best Case, Worst Case, Average Case, Factors depends on running time, Introduction to Recursion, Divide and Conquer Algorithm, Evaluating time Complexity.
Unit-5	Straight Sequential Search, Array implementations, Linked implementation, Binary Search, Interpolation Search. Introduction, Sorting by exchange, selection, insertions, Bubble sort, Selection sort, Insertion sort, Efficiency of above algorithms, Merge sort, Quick sort Algorithm, Heap sort, Heap Construction, Heap sort, Radix sort.

-

TEXT BOOK:

1. Text Book : Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.

REFERENCE BOOKS:

1. Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
2. Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW.

M.Sc. (Computer Science)

II Semester

CS - 202 Database Management System

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS

Learning Outcomes:

upon successful completion of this course, students should be able to:

- Describe the fundamental elements of relational database management systems
- Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
- Design ER-models to represent simple database application scenarios
- Convert the ER-model to relational table, populate relational database and formulate SQL queries on data .
- Improve the database design by normalization.
- Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test . 2.Each theory question paper will contain 5 question of 2 sub part of 17 marks. 3.Each theory paper is of 85 marks. In which there is an assignment of 15 marks.

Also, the practical of 50 marks is taken by the college.

Unit No	Topics
Unit-1	<p>Introduction: Advantages of DBMS approach, Various views of data, data independence, schema & sub-schema, primary concept of data models, database languages, transaction management, database administrator & user, data dictionary, database architectures.</p> <p>ER model: Basic concept, design issues, mapping constraint, keys, ER diagram, weak & strong entity-sets, specialization & generalization, aggregation, inheritance, design of ER schema, Reduction of ER Schema to tables. Domains, relation, kind of relation, Relational databases, Various types of keys: candidate, primary, alternate & foreign keys.</p>
Unit-2	<p>Relational Algebra and SQL: The structure, relational algebra with extended operations, modification of database, Idea of relational calculus.</p> <p>Relational Database: Basic structure of SQL, Set operation, Aggregate functions, Null values, Nested Sub queries, derived relations, views, Modification of database, join relation, Domain, relation & keys, DDL in SQL.</p> <p>Programming concepts of PL/SQL, Stored procedure, Database connectivity with ODBC/JDBC.</p>
Unit-3	<p>Functional dependencies: Basic definitions, Trivial & non trivial dependencies, closure set of dependencies & of attributes, Irreducible set of dependencies, FD diagram.</p> <p>Normalization: Introduction to normalization, non loss decomposition, First, second and third normal forms, dependency preservation, BCNF, multivalued dependencies and fourth normal form, join dependencies and fifth normal form.</p> <p>Database Integrity: general idea, integrity rules, Domain rules, Attributes rules, assertion, triggers, integrity & SQL</p>
Unit-4	<p>Transaction Management: basic concept, ACID properties, transaction state, Implementation of atomicity & durability, Concurrent execution, Basic idea of serializability.</p> <p>Concurrency & Recovery: Basic idea of concurrency control, basic idea of deadlock, Failure Classification, storage structure-types, stable storage implementation, data access, recovery & Atomicity: log based recovery, deferred database modification, immediate database modification, checkpoints.</p>
Unit-5	<p>Storage Structure: overview of physical storage media, magnetic disk: performance & optimization, RAID.</p> <p>File Organization: File organization, Organization of records in files, basic concept of Indexing, ordered indices: B+ tree & B tree index files.</p> <p>Query processing, Query optimization, Introduction to data mining and data Warehousing</p>

-

TEXT BOOK:

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems (5/e), Pearson Education, 2008

REFERENCE BOOKS:

1. Silberschatz, Korth, "Data base System Concepts", 4th ed., McGraw hill, 2006.
2. Raghuram Ramakrishnan and Johannes Gehrke, Database Management Systems (3/e), McGraw Hill, 2003.
3. Peter Rob and Carlos Coronel, Database Systems- Design, Implementation and Management (7/e), Cengage Learning, 2007

M.Sc. (Computer Science) CS - 203

II Semester

Software Engineering

Session – 2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

1. To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases.
2. To provide an idea of using various process models in the software industry according to given circumstances.
3. To gain the knowledge of how Analysis, Design, Implementation, Testing and

Learning Outcomes:

upon successful completion of this course, students should be able to:

1. Students will be able to decompose the given project in various phases of a lifecycle.
2. Students will be able to choose appropriate process model depending on the user requirements.
3. Students will be able to perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.
4. Students will be able to know various processes used in all the phases of the product.
5. Students can apply the knowledge, techniques, and skills in the development of a software product.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test.
2. Each theory question paper will contain 5 questions of 2 sub parts of 17 marks.

Unit No	Topics
Unit-1	Introduction to Software Engineering & Software Processes: Software problem, Software engineering problem, Software engineering approach, Software characteristics and Applications. Software processes and its components, characteristics of software processes, Software development processes: Linear Sequential model, Prototyping model, Iterative Enhancement model, Spiral model, Time boxing model, RAD model, Component based development, Comparative study of various development models.
Unit-2	Project management process: The people, product, process and project, Phases of project management process, Project life cycle, the W5HH principle. Software configuration management process, Process management process. Project Planning: Metrics and measurements, Project estimation (Size & Cost), Project Scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans, Risk management.
Unit-3	Software Requirement Analysis and Specification: Software requirements, Functional & Non functional requirements, Problem analysis (Structured analysis and Object Oriented analysis, Prototyping approach). Software Requirements specifications (SRS), Validation and Verification, Metrics. Software Design: Design principles: Problem partitioning and hierarchy, Abstraction, Modularity, Top-down and Bottom-up strategies. Effective Modular design: functional independency, Cohesion, Coupling. Structured design methodology
Unit-4	Software Quality Assurance: Quality concept, Quality management system, movements and assurance, Software reviews: formal and technical. Formal approaches to SQA, Statistical software quality assurance, Software reliability, Capability Maturity Model (CMM), ISO 9000, Six sigma, SQA plan.
Unit-5	Software Testing: Software testing techniques: Testing fundamentals, White box testing, Black box testing, Testing for specialized environments, architectures and applications. Software testing strategies: A strategic approach to software testing, Strategic issues, Unit testing, Integration testing, Validation testing and system testing, The art of debugging.

TEXT BOOK:

1. An Integrated Approach to Software Engineering- Pankaj Jalote, Narosa Publishing House.

REFERENCE BOOKS:

1. Software Engineering- Ian Sommer ville, Pearson Education, New Delhi.
2. Software Engineering Concepts-Richard E. Fairly, Tata McGraw Hill Inc. New York.
3. Software Engineering: Principle & Practice-W. S. Jawadekar, Tata McGraw-Hill, New York.

M.Sc. II Semester(Computer Science)

CS - 204 Computer Architecture and Organization

Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

1. How computer work, basic principles.
2. How to analyze their performance (or how not to).
3. How computers are designed and built.
4. Students can be able to distinguish between cost and performance (like uniprocessor and multiprocessor)

Learning Outcomes:

Upon completion of this course, the students will be able to:

- 1 Describe the fundamental organisation of a computer system
- 2 Explain the functional units of a processor
- 3 Explain addressing modes, instruction formats and program control statements
- 4 Distinguish the organization of various parts of a system memory hierarchy
- 5 Describe basic concept of parallel computing
- 6 Describe fundamentals concepts of pipeline and vector processing

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test . 2.Each theory question paper will contain 5 question of 2 sub part of 17 marks.

3.Each theory paper is of 85 marks. In which there is an assignment of 15 marks.

Also, the practical of 50 marks is taken by the college.

Unit No	Topics
Unit-1	Technological trends, measuring performance, speed up Amdahl's law. Basic structure of computer hardware: Functional units and components in computer organization: The memory unit, the input and output subsystem, the bus structures, ALU. Program development tools: Compiler, interpreter, and assembler. Introduction to 8085 micro processor architecture. pin out diagram of 8085 microprocessor. Addressing modes of 8085 processor..
Unit-2	Instruction set of 8085 processor: data transfer instructions, arithmetic instructions, branch instructions etc. assembly language programming examples. Introduction to 8088 microprocessor. Bit pair multiplication. Integer division. BCD arithmetic, Design of ALU. Concepts of instruction formats and instruction set, Instruction set types, types of operands and operations. Generation of memory address and addressing modes.
Unit-3	STACKS and QUEUS, GPR organization and stack based organizations. Encoding of machine instructions. Features of RISC and CISC processors. Processing unit design: Processor micro architecture –I Fundamentals concepts for data path implementation. Processor micro architecture-II data path implementation.
Unit-4	Instruction pipelining, instruction pipelining hazards, data dependency hazards and control hazards. Overcoming hazards, instruction set design influence on pipelining. Parallel processing and pipelining, pipelining in RISC and CISC processors. Super scalar processors. In order and out of order execution.
Unit-5	Instruction level parallelism, introduction to VLIW processors, vector processors, CACHES: Data caches, instruction caches and unified caches Cache implementations. Fully associative and direct mapped caches. Write back versus write through caches. Input Output organization, accessing I/O devices, Interrupts. Memory mapped I/O and I/O mapped I/O.

REFERENCE BOOKS:

TEXT BOOK:

1. The 8088 and 8086 Microprocessors by Walter A. Tribel, Avtar Singh.
2. Computer Organization & Architecture by William Stallings.
3. Computer Architecture & Parallel Processing, Hwang & Briggs, McGraw Hill Microprocessor Archi. Prog. and app. With 8085/8080 By Ramesh S. Gaonkar

M.Sc. (Computer Science)

II Semester

CS - 205 Computer Oriented numerical and statistical method Session-2020-21

Subject Nature	Compulsory
-----------------------	-------------------

Course Objectives:

The main objective of this course is to understand and implement various

Learning Outcomes:

Upon successful completion of the course the students will be able to Understand the various approaches dealing the data using theory of probability.

- Analyze the different samples of data at different level of significance using various hypothesis testing
- Develop a framework for estimating and predicting the different sample of data for handling the uncertainties
- Learn how to obtain numerical solution of nonlinear equations using Bisection, Newton – Raphson and fixed-point iteration methods.
- Solve system of linear equations numerically using direct and iterative methods.

Examination Scheme-

1. The end of semester examination will be worth 15 marks having assignment/test .
- 2.Each theory question paper will contain 5 question of 2 sub part of 17 marks.
- 3.Each theory paper is of 85 marks. In which there is an assignment of 15 marks.

Also, the practical of 50 marks is taken by the college.

Unit No	Topics
Unit-1	Solution of non-linear & transcendental equations Computer Arithmetic: Floating- point representation of numbers, arithmetic operations with normalized floating-point numbers and their consequences, significant figures. Error in number representation-inherent error, truncation, absolute, relative, percentage and round- off error. Iterative Methods: Bisection method, method of false position, newtonrapson method, secant method, method of successive approximation,

	concept oriented theoretical consideration of above methods.
Unit-2	Solution of linear equations Meaning, conditions for solutions, solution of equation by direct methods - (Gaussian elimination, Gaussian jordan), iterative methods - (Jacobi method, gaussian seidel), ill-conditional equations and solution
Unit-3	Interpolation and approximation Introduction, finite differences, Newton's formulae, Central difference formulae, interpolation with unevenly spaced points, divided difference and their properties, inverse interpolation and double interpolation.ion.
Unit-4	Numerical integration & solution of ordinary differential equations Concept of numerical integration with geometrical representation, trapezoidal method, simpson - 1/3 rule, simpson - 3/8 rule, veddle's rule, understanding and solution of Ordinary Differential Equation and theoretical consideration, euler method, modified euler's method, R-K 2nd order & 4th order method, predictor corrector methods.
Unit-5	Statistics Graphical representation, Frequency distributions, Measures of central tendency, Measures of dispersions, Correlation, Regression.

-

TEXT BOOK:

REFERENCE BOOKS:

1. S. S. Sastry, Introductory Methods of Numerical Analysis.
2. M. K. Jain, S.R.K. Iyengar & R. K. Jain, Numerical Methods for Scientific and Engineering Computation.
3. H. C. Saxena, Finite Differences and Numerical Analysis.
4. Modes A., Numerical Analysis for Computer Science.

Department of Chemistry
Syllabus session – 020-21
Class B.Sc. I year

Title of the paper: Physical Chemistry

Name of the paper: Physical Chemistry

Examination scheme :

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 29	Theory maximum marks - 28	Theory maximum marks - 28
CCE maximum marks -05	CCE maximum marks -05	CCE maximum marks -05
Practical maximum marks - 50		

Course Objective-

1. Physical Chemistry is a branch of chemistry that studies the physical and material properties of a chemical system or chemical process.
2. Chemistry is a big part of your everyday life. You find chemistry in food, the air, cleaning chemicals, your emotions and literally every object you can see or touch.
3. Inorganic compounds are used as catalysts, pigments, coatings, surfactants, medicines, fuels and more oxygen is both organic and inorganic compound but the oxidation itself has inorganic chemistry mechanism.
4. The use of organic compounds has simplified human life. The significance of organic compounds in daily life and industry can be stated in the following way. Food vitamins, proteins, sugar, wheat, lipids and other organic compounds.

Learning Outcomes -

1. Colloids are used for electrical precipitation of smoke, purification of drinking water, medicine, tanning, cleansing action of soap and detergent, photographic plates and films, Rubber Industry, in disinfectant, metallurgy, colloidal graphite. artificial rain etc.
2. Chemical equilibrium is a state in the course of a chemical reaction where the concentrations of both products and reactants reach the limit which prevents further deviation.
3. When you understand a mathematical concept you have essentially reached an upper tier in math that allows you to think and process abstractly.
4. Ideal gases are used to determine ideal efficiencies of engine and in various thermal equipments to determine various output parameters theoretically
5. The gaseous state is the easiest to study. An change in temperature results in evident changes in other quantities like volume and pressure.
6. Seven - segment displays are commonly used in digital clocks, clock radios, times wrist watches and calculators.

Department of Chemistry
Syllabus session – 020-21
Class B.Sc. I year

Paper second -

Title of the paper: Inorganic chemistry

Name of the paper: Inorganic chemistry

1. The atomic structure of an element refers to the constitution of its nucleus and the arrangement of the electrons around it. Primarily, the atomic structure of matter is made up of protons, electrons and neutrons.
2. The periodic table is useful for modern students because it helps predict the types of chemical reactions that a particular element is likely to participate in. Rather than memorizing facts and figures for each element, students need only glance at the table to learn much about the reactivity of an element, whether it is likely to conduct electricity, whether it is hard or soft, and many other characteristics.
3. The strength of the attractive forces depends on the charge and size of the ions that compose the lattice and determines many of the physical properties of the crystal.
4. Inert atmospheres, which are commonly used for arc welding, specimen protection, and chemical reaction prevention, are created using noble gases. Neon lights and krypton headlights, as well as lasers, contain the elements. Superconducting magnets are cooled with helium, which is also used in balloons and deep-sea diving air tanks.
5. Silicates are the most abundant class of minerals on Earth. Sand and quartz crystals are silicates, and silicon is its central part. Because of their unique properties, silicates have many cool technological uses.

Department of Chemistry
Syllabus session – 020-21
Class B.Sc. I year
Paper Third

Title of the paper: Organic chemistry

Name of the paper: Organic chemistry

1. To understand structure and bonding, students need to know about the orbital model of the atom, plus covalent, ionic and metallic bonding:
2. The purpose of the IUPAC system of nomenclature is to establish an international standard of naming compounds to facilitate communication. The goal of the system is to give each structure a unique and unambiguous name, and to correlate each name with a unique and unambiguous structure.
3. Cyclo-alkanes are also called cycloparaffins. They are Alicyclic Compounds i.e. they are both aliphatic and cyclic compounds, and their properties are almost similar to alkanes.
4. The alkenes are also too useful in the chemical industry for the manufacture of plastics and many other chemicals to be used as fuels.
5. In organic chemistry, an alkyne is an unsaturated hydrocarbon containing at least one carbon-carbon triple bond. Like other hydrocarbons, alkynes are generally hydrophobic.
6. Stereochemistry, a sub-discipline of chemistry, involves the study of the relative spatial arrangement of atoms within molecules. An important branch of stereochemistry is the study of chiral molecules . Stereochemistry is also known as 3D chemistry because the prefix "stereo-" means "three-dimensionality .

Department of Mathematics
Syllabus session – 020-21
Class B.Sc. I year

Title of the paper: – Algebra and Trigonometry

Subject Nature – Compulsory

Examination scheme :

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 40	Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10	CCE maximum marks -10

Course Objective –

To enforce the students with the Matrix and solving linear equations upto three unknowns. To provide the foundation of Logic and circuits so that it would be applicable in real life problem.

Learning Outcome –

At the end of the course students should be able to -

- Find the rank of matrix, solve system of equations.
- Learn about relation b/w the roots and coefficients.
Enhance the knowledge of logical connectives.
- Get knowledge about direct and inverse circular and hyperbolic functions.

Department of Mathematics
Syllabus session – 020-21
Class B.Sc. II year

Title of the paper: – Calculus and Differential Equations Algebra and Trigonometry
Subject Nature – Compulsory

Course Objective –

To enforce the students with the successive differentiation and curvatures. To provides the foundation of Linear differential equations. So that it would to helpful to students to solve the higher degree equations. The course is also provides the basic of geometrical meaning of differential equations.

Learning Outcome –

- At the end of the course students should be able to
- To find successive differentiation and get knowledge about curvature.
 - Enhance the knowledge of integration and reduction formula.
 - Learn about geometrical meaning of a differential equation.

Department of Mathematics

Syllabus session – 020-21

B.Sc. I year

Paper – III

Title of the paper– Vector Analysis and Geometry

Subject Nature – Compulsory

Course Objective –

To enforce the students with the product of four vectors. Introduce vector integration and some theorem. To provide the knowledge of tracing of conics.

Learning Outcomes –

At the end of the course the students should be able to

- To find gradient, divergence and curl of any function. Enhance the knowledge of vector integration.
- The student will be known about conical surfaces and enhance their knowledge about hyperboloid of one and two sheets and their properties.

Department of Physics
Syllabus session – 020-21
Class B.Sc. I year

**Title of the paper: – MATHEMATICAL PHYSICS, MECHANICS
AND PROPERTIES OF MATTER**

Subject Nature – Compulsory

Examination Scheme :

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical -50	

Course Objective :

1. The course would empower the students to develop the idea about the behavior of physical bodies
2. It will provide the basic concepts related to the motion of all the objects around us in daily life.
3. The students will acquire the knowledge of basic mathematical methods and understand the relativistics effect and the relation between energy and mass.
4. The course would enable the students the understands the basic physics of the heat and temperature in relation to energy, work, radiation and matter.
5. The students are accepted to learn laws of thermodynamics and students will understands the importants of studying of statistical mechanics with the behavior of the particle under classical and quantum conditions.

Learning Outcome :

At the end of the course students should be able to :

The students would be able to build foundation to various applied field in science and technology specially in the field of mechanical engineering .

This course will also develop and understanding of the various concepts of statistics and methods to apply then in thermodynamics.

Course Contents :

(PAPER - I)

MATHEMATICAL PHYSICS, MECHANICS AND PROPERTIES OF MATTER

UNIT – I (MATHEMATICAL PHYSICS)

The course will enable the students to develop ideas about the behavior scalar and vector field, Gradient , Divergence, Curl and numerical problems based on the above topics.

UNIT- II (MECHANICS)

The course gives details about the basic concept of Newtons law of motions and its explanation with problems, various types of force in natures. Kepler's law, Gravitational law, Gravitational self energy, Center of mass and reduced mass, elastic and inelastic collision.

UNIT- III (GENERAL PROPERTIES OF MATTER)

This course is useful in explaining to the students the basic concept Elastic moduli and their relation, surface tension, angle of contact and application of surface tension and concept of viscous force and viscosity .

UNIT- IV (oscillators)

Course introduces students to Concept of simple, periodic and harmonic oscillation with illustration kinetic and potential energies of harmonic oscillators, moment of inertia and motion of rigid bodies.

UNIT- V (Relativistic mechanics)

The course provides students about the Michelson morley experiment and its outcomes postulates of special theory of relativity, Lorentz transformation, Doppler effect and earlier developments of physics up to eighteenth century.

Department of Physics
Syllabus session – 020-21
Class B.Sc. I year

Title of the paper: – THERMODYNAMICS AND STATISTICS PHYSICS

Subject Nature – Compulsory
(PAPER - II)

UNIT – I (THERMODYNAMICS-I)

Syllabus provide the students about the Basics concepts of reversible and irreversible process heat engine, steam engine, petrol engine and carnot cycle and its application.

UNIT – II (THERMODYNAMICS-II)

Syllabus provide the students concepts of entropy, change of entropy in adiabatic process, principle of increase of entropy T-S Diagram, Third laws of Thermodynamics and relation between Thermodynamics variables.

UNIT – III (STATISTICAL PHYSICS-I)

Syllabus provide the students Description of a system, significant of statistical approach particle state, equilibrium state, classical and statistical probability, statistical ensemble and Gibbs free energy,

UNIT – IV (STATISTICAL PHYSICS-II)

From the course students learn statistical mechanics, phase space, probability of distribution, MB statistics, quantum statistics, partition function, BE statistics, FD statistics Black body radiation in concept of phase transitions.

UNIT – V (Contribution of physicists)

From the syllabus students study Contribution of physicists – M.N. Saha, S.N.Bose, Mexwell, Clausius, Bohr, Joule, Wien, Einstein

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Course Objectives

Know the concept and application of class thermodynamic electrochemical and other physical phenomenon.

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 27	Theory maximum marks - 27	Theory maximum marks - 26
CCE maximum marks - 07	CCE maximum marks - 07	CCE maximum marks -06
Practical maximum marks - 50		

Course Learning Outcomes

C01*

1. Thermodynamics is a branch of Physical chemistry that deals with heat, work and temperature and their relation to energy radiation and physical properties of matter.
2. Thermodynamics applies to a wide variety of topics in science and engineering especially physical chemistry biochemistry chemical engineering mechanical engineering and meteorology.

C02*

1. Phase rule is useful to metallurgist's materials engineers – Development of new alloys for special application.

2. Fabrication of these alloys in to useful configuration.
3. design and control of heat treatment procedure of specific alloys these are many application of distribution law.
 - a. Solvent extraction.
 - b. Partition chromatography.
 - c. Desilverisation of lead.
 - d. Determination of dissociation and association.

CO3*

Explain electrolytic conduction and various types of conductance (molecular & equivalent). Describe Kohlrausch law and transport numbers. Explain the functions of various electrode reaction.

CO4*

Describe the functions various types of electrodes and also the knowledge of PH and buffer solution and Henderson Henderson equation.

CO5*

1. Surface chemistry plays an important role in industrial technologies for chemical and energy conversion health care material and environment protect.
2. Used in syrups paints tooth paste digestion of fats, pigment and dye.

Title of the paper: Inorganic chemistry course objective

To introduce student's d & f block elements coordination compound, oxidation reduction and acid-base concepts.

Couse Learning outcomes

CO1* The students will be able to explain characteristic properties of elements of first transition series & their compounds with stability geometry.

CO2* Students will able to describe properties of 2nd & 3rd transition series elements and their comparative study with 1st series elements.

CO3* The students will be able to explain fundamental concept of coordination chemistry. Structure and bonding in coordination compounds, oxidation reduction & principals involved in extraction of metals.

CO4* The students will get complete understanding of F block elements & their properties.

CO5* The students will be able to classify the compounds into acid or base, using different concepts will be familiar with reactions occurring in non-aqueous solvents.

Title of the paper: Organic chemistry

To understand the structure of molecules through spectroscopy, reaction mechanism different functional groups, their proper structure activity relationship. This is of great help in the industry.

Course of Learning Outcomes

CO1* To enable the students to know about electromagnetic spectra, absorption and emission spectra, mainly UV and IR, UV and IR spectroscopy is a branch of organic chemistry which helps in the structure elucidation of organic molecules.

CO2* To help students to learn about the different types of alcohols and phenols on to know their preparation properties structure and uses.

CO3*To help students to know about the different types of aldehydes and ketones and to learn about their preparation properties, structure and uses.

CO4*To help students to know about the different type of carboxylic acids and to learn about their preparation, properties, structure and uses.

CO5*To help students to know about the different types of compounds of nitrogen like amino compounds, nitro compounds, azo compounds and to learn about their preparation, properties structure and uses.

Department of Chemistry

Session – 2020-21

Class B.Sc. II year

Programme Outcomes

- 1.** Students acquire knowledge about the concepts in organic, inorganic and physical chemistry.
- 2.** Students develop the skills on different methods of qualitative and quantitative analysis.
- 3.** Students be able to appreciate the applications of chemistry in day to day life and explore new areas and allied fields of science and technology.
- 4.** Clear understanding of the fundamental concepts in organic, inorganic, physical and analytical chemistry.
- 5.** Ability to perform scientific experiments skilfully by application of procedural knowledge.
- 6.** Idea about research in chemistry and knowledge of the significance of the scientific concepts learnt which find application in, industry, medicine and modern research.
- 7.** Capacity of working in research labs and related fields.

Programme specific outcomes: To impart knowledge on different topics of chemistry inorganic, organic, physical and analytical; of the level expected from a graduate in chemistry.

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – I

Title of the paper – Abstract Algebra

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks -	Theory maximum marks -	Theory maximum marks -
CCE maximum marks -	CCE maximum marks -	CCE maximum marks -

Course Objective –

To enforce the students with the basic properties of groups. To provide the basic knowledge of Homomorphism and isomorphism of groups define rings and its basic properties, field and quotient field.

Learning Outcomes –

At the end of the course students should be able to

- Study groups, types of groups they will learn about Homomorphism and isomorphism.
- Enhance their knowledge about conjugacy Relation, Normalizer. They will study of Cauchy's theorem.
- They will know about Ring, types of rings and its properties. They are also known about integral domain and field.

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – II

Title of the paper – Advanced Calculus

Subject Nature – Compulsory

Course Objective –

To enhance the knowledge of students in advanced calculus provide basic knowledge about sequence, convergence. Introduce continuity of functions, maxima and minima of function of two variables.

Learning Outcomes –

At the end of the course the students should be able to

- Known what is sequence and convergence. They will also known about different types of test of convergence.
- They will learn about partial differentiation, Euler's function and Jacobins.
- They will know about Envelops and evaluates maxima and minima.

Department of Mathematics

Session – 2020-21

Class B.Sc. II year

Paper – III

Title of the paper – Differential Equations

Subject Nature – Compulsory

Course Objective –

In this paper students enhance their knowledge about power series, Bessel's and Legendre's function. Introduce Laplace transformation and its linearity. To enforce the students with the Char pit's general method. Homogeneous and non-Homogeneous equation.

Learning Outcomes –

At the end of the course the students should be able to

- Study Bessel's and Legendre's equations they will learn Laplace Transformation.
- They will study inverse Laplace transform and its application.
- Enhance their knowledge about partial differential equations and Lagrange's solution.

Department of Physics

Session – 2020-21

Class B.Sc. II year

Paper – I

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks 40	Theory maximum marks 40
CCE maximum marks 10	CCE maximum marks 10
Practical maximum marks 50	Practical maximum marks 50

Course Objective : To enforce the students with the strength of physics fundamentals and scope of optics, electrostatics and magnetostatics.

To provide the foundation for 360 degree dimensional platform of technology and science so that is would open vistas for profession, research and career.

Learning Outcome :

At the end of the course students should be able to :

The wave optics part of the course will give the student a basic knowledge within interference , polarization, diffraction, and the basics of coherent and non-coherent light sources.

The student should be able to understand the concept of electric field lines and use their understanding to predict the electric field lines about a point charge or a configuration of point charges.

Course Contents :

(PAPER - I)

UNIT – I (GEOMETRICAL OPTICS)

The course will enable the students to develop ideas about the behavior of optics.

UNIT- II (INTERFERENCE OF LIGHT)

The course gives details about the basic concept of waves interference and their behavior to the students Through this student can compile Newton ring experiments and other experiments with details.

UNIT- III (DIFFRACTION)

This course is useful in explaining to the students the basic concept of diffraction of light and its types in detail. Through this, students can study the spectrum of grating and prisms and find the resolving power of microscope telescope and grating.

UNIT- IV (POLARISATION)

Course introduces students to polarized and non-polarized light Through this student can easily understand Brewster Law With the help of student can easily understand quarter wave plate and half wave plate and babinet's compensator.

UNIT- V (LASERS AND PHOTO SENSORS)

The course provides students about the history and characteristics of lasers and its uses in daily life. Syllabus gives knowledge of photo sensors to students.

(PAPER - II)

UNIT – I (ELECTROSTATICS)

Syllabus provide the students about the basic concepts of Static Electricity and give the knowledge of coloumb's law gauss law and its applications Students study various types of capacitors from the course.

UNIT – II (MAGNETOSTATICS)

Syllabus provide the students Force on a moving charge in a magnetic field, Lorentz force and derivation of Lorentz formulas with the help of this student's study of biot savart's law and its application.

UNIT – III (CURRENT ELECTRICITY AND BIOELECTRICITY)

Syllabus provide the students basic concept of current electricity and analysis of multi loop circuit. Observing and studying electricity in biological bodies.

UNIT – IV (MOTION OF CHARGED PARTICLES IN ELECTRIC AND MAGNETIC FIELD)

From the course students learn electron gun, CRO and sensitivity of CRO and Thomson's methods for the determination of specific charges of electron.

UNIT – V (ELECTRODYNAMICS)

From the syllabus students study Magnetic Flux, Faraday's Law and Maxwell's Law, which are used to solve the problem related to the subject.

Department of Mathematics

Session – 2020-21

Class B.Sc. III year

Title of the paper: Linear Algebra and Numerical analysis

Subject Nature – Compulsory

Examination Scheme:

PAPER - I	PAPER –II
Theory maximum marks - 40	Theory maximum marks - 40
CCE maximum marks -10	CCE maximum marks -10
Practical - 50	

Course Objective –

To enforce the students with the vector spaces and sub spaces. To provides the foundations of numerical analysis and linear transformation. The course is also providing the different methods for solution of equations.

Learning Outcomes –

At the end of the course students should be able to

- Understand relation between linear transformation and matrix representation.
- Use the concept of inner product space to find norm of vector.
- After completing numerical analysis, they will be able to find solution of different equations.

Department of Mathematics

Session – 2020-21

Class B.Sc. III year

Title of the paper: Real and Complex Analysis

Subject Nature – Compulsory

Course Objective –

This course contains the different types of integrals. The course enforces the students with integral calculus. This course provides the foundation of Metric spaces and continuous functions. The course also provides series solution of analytical function.

Learning Outcomes –

At the end of the course students should be able to

- Solve the problem based on convergence.
- In the part of metric spaces, they learn to find neighbourhoods, limit points etc.
- They get knowledge about power series representation of an analytical function.

Department of Mathematics

Session – 2020-21

Class B.Sc. III year

Title of the paper: Discrete Mathematics

Subject Nature – Compulsory

Course Objective –

To enhance the knowledge of student in discrete mathematics and enforce the students with the Boolean functions. To provide the foundation of graph theory and its properties. The course also provides the methods of matrix representation of graphs.

Learning Outcomes –

At the end of the course the students should be able to

- Solve problems related with discrete objects and binary relations, graphical representation of objects.
- They will study a special type of relation that is exceptionally useful in a variety of computer science application.

Department of Chemistry

Syllabus session – 2020-21

Class B.Sc. III year

Title of the paper: Physical Chemistry

Nature of the paper: Compulsory

Examination Scheme:

PAPER - I	PAPER –II	PAPER –III
Theory maximum marks - 27	Theory maximum marks - 27	Theory maximum marks - 26
CCE maximum marks - 07	CCE maximum marks - 07	CCE maximum marks -06
Practical maximum marks - 50		

Paper I

Course Outcomes-

Elementary quantum mechanics

Quantum mechanics is an important tool to understand at the theoretical level the electronic structure of chemical compounds and the mechanism, thermodynamics, and kinetics of chemical reactions. Quantum mechanics, science dealing with the behaviour of matter and light on the atomic and subatomic scale. It attempts to describe and account for the properties of molecules and atoms and their constituents—electrons, protons, neutrons, and other more esoteric particles such as quarks and gluons.

--spectroscopy

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to

be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

--**Rotational spectrum and vibration spectrum**

The key difference between rotational and vibrational spectroscopy is that rotational spectroscopy is used to measure the energy of the transitions that take place between quantized rotational states of molecules in the gas phase, whereas vibrational spectroscopy is used in measuring the interaction of IR radiation ...

-- **raman spectrum**

Raman spectroscopy can differentiate chemical structures, even if they contain the same atoms in different arrangements. Analyse your sample multiple times without damage. If you can use an optical microscope to focus onto the analysis region, you can use a Raman microscope to collect its Raman spectrum.

--**Electronic spectrum**

Students will identify and compare characteristics of the electromagnetic spectrum including speed, wavelength and frequency. Students will identify common uses and applications of electromagnetic waves. Students will use algebraic equations to calculate and describe the wavelength, frequency and speed of EM radiation.

--**UV spectrum**

Will be able to interpret UV-Visible spectroscopy, 1.1 Explain basic principles of UV-Visible spectroscopy, 1.2. Explain relevant terms of

UV-Visible spectroscopy, 1.3. Explain working principle, taking spectra and outline of UV spectroscopy device, 2. Will be able to interpret IR spectroscopy,

--**photochemistry**

Formulate the macroscopic and quantum laws of the absorption of light by molecules and solids. Describe the various deactivation processes of molecular excited states. Characterize the kinetics of deactivation processes and their role in the photochemical reactivity.

--**physical property and molecular structure**

Students will compare, contrast and predict physical and chemical properties based on atomic and molecular structure. Students will apply these principles to the chemistry of living systems and demonstrate the ability to solve quantitative, interdisciplinary, and real-world problems.

Students will observe safe practices in the laboratory and will know how to respond in an emergency. Students will learn to gather hazardous materials information and will recognize and respond properly to potential hazards of handling chemicals and chemical waste.

Department of Chemistry

Syllabus session – 2020-21

Class B.Sc. III year

Title of the paper: Inorganic Chemistry

Nature of the paper: Compulsory

Paper II

--Hard and soft acids and bases (HSAB)

Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical, Inorganic, Organic and Physical Chemistries. Majors to be certified by the American Chemical Society will have extensive laboratory work and knowledge of Biological Chemistry.

Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of such experiments.

--silicones and phosphazenes

Understand the electrophilic and nucleophilic reactions. Understand the addition, substitution, replacement and rearrangement reactions. Knowledge of important reagents used in chemical industries. Understand the reaction mechanism of various name reactions.

--metal ligand bonding in transition metal complexes

The transition elements and main group elements can form coordination compounds, or complexes, in which a central metal atom or ion is bonded to one or more ligands by coordinate covalent bonds. Ligands with more than one donor atom are called polydentate ligands and form chelates.

--thermodynamics and kinetic aspects of metal complexes.

thermodynamic stability of complexes is the measure of tendency of a metal ion to selectively form a specific metal complex and is directly related to the metal-ligand bond energies. The thermodynamic stability of complexes is represented by formation constant.

--**magnetic Properties of transition metal complex.**

Due to the presence of unpaired electrons in the $(n-1)d$ -orbitals, most of the transition metals ions and their compounds are paramagnetic i.e. they are attracted by the magnetic field. 2. As the number of unpaired electrons increases from 1 to 5, the magnetic moment and hence paramagnetic character also increase.

--**electronic spectra of transition metal complex.**

The spectra of transition metal complexes is not as simple as it appears from just the splitting of d - orbitals with electrons get promoted from the lower energy orbital set to a higher energy orbital set.

--**bio organic chemistry**

You'll learn about atoms and orbitals; hybridization and bonding. You'll learn about the basic molecules, including how to name them. This will allow you to carry out reactions on exams when given a name instead of a structure.

Department of Chemistry

Syllabus session – 2020-21

Class B.Sc. III year

Title of the paper: Organic Chemistry

Nature of the paper: Compulsory

Paper III

--nuclear magnetic resonance spectroscopy.

relate NMR parameters such as chemical shift, scalar coupling constants, and relaxation time constants to molecular structure. the ability to investigate and determine the structure of typical organic chemical compounds (molecular weight up to ca.

--organo- metallic compounds.

knows the most important classes of ligands found in organometallic compounds. has broad knowledge of nomenclature, coordination modes, geometries, and fundamental reaction types. has knowledge of the chemical bonds and the theories that explain the electronic properties within organometallic ...

--organo sulphur compounds.

Organosulfur compounds are organic molecules that contain sulfur and are associated with the pungent odors characteristic of allium vegetables such as garlic and onions. They are also abundant in cruciferous vegetables such as broccoli and cabbage.

--carbohydrate

Describe the different types of simple and complex carbohydrates. Describe the process of carbohydrate digestion and absorption. Describe the functions of carbohydrates in the body. Describe the body's carbohydrate needs and how personal choices can lead to health benefits or consequences.

--fat, oil and detergents.

Fats and oils that are in contact with moist air at room temperature eventually undergo oxidation and hydrolysis reactions that cause them to turn rancid, acquiring a characteristic disagreeable odor. One cause of the odor is the release of volatile fatty acids by hydrolysis of the ester bonds.

--Amino acid, peptide, protein and nucleic acid.

understand that the human body, and everything else, is made up of atoms and that there are about 26 different sorts of atom in the human body, combined into numerous different sorts of molecules

understand that amino acids contain carbon, nitrogen, oxygen and hydrogen atoms, some contain an atom of sulphur and that there are about 20 different amino acids, with different side-chains (R groups)

understand that amino acids are linked via peptide bonds to make polypeptides and proteins.

--synthetic dyes

In this regard, a variety of dyes, including anthraquinones, aryl amines, azo dyes, BODIPY, carbazoles, cyanines, fluoresceins, oxazines, phenothiazines, rhodamines, squaraines, thiophene dyes, etc., were collected and discussed.

--Pericyclic reactions

Since pericyclic reactions proceed by a cyclic reorganization of bonding electron pairs, it is necessary to evaluate changes in the associated molecular orbitals that take place in going from reactants to products.